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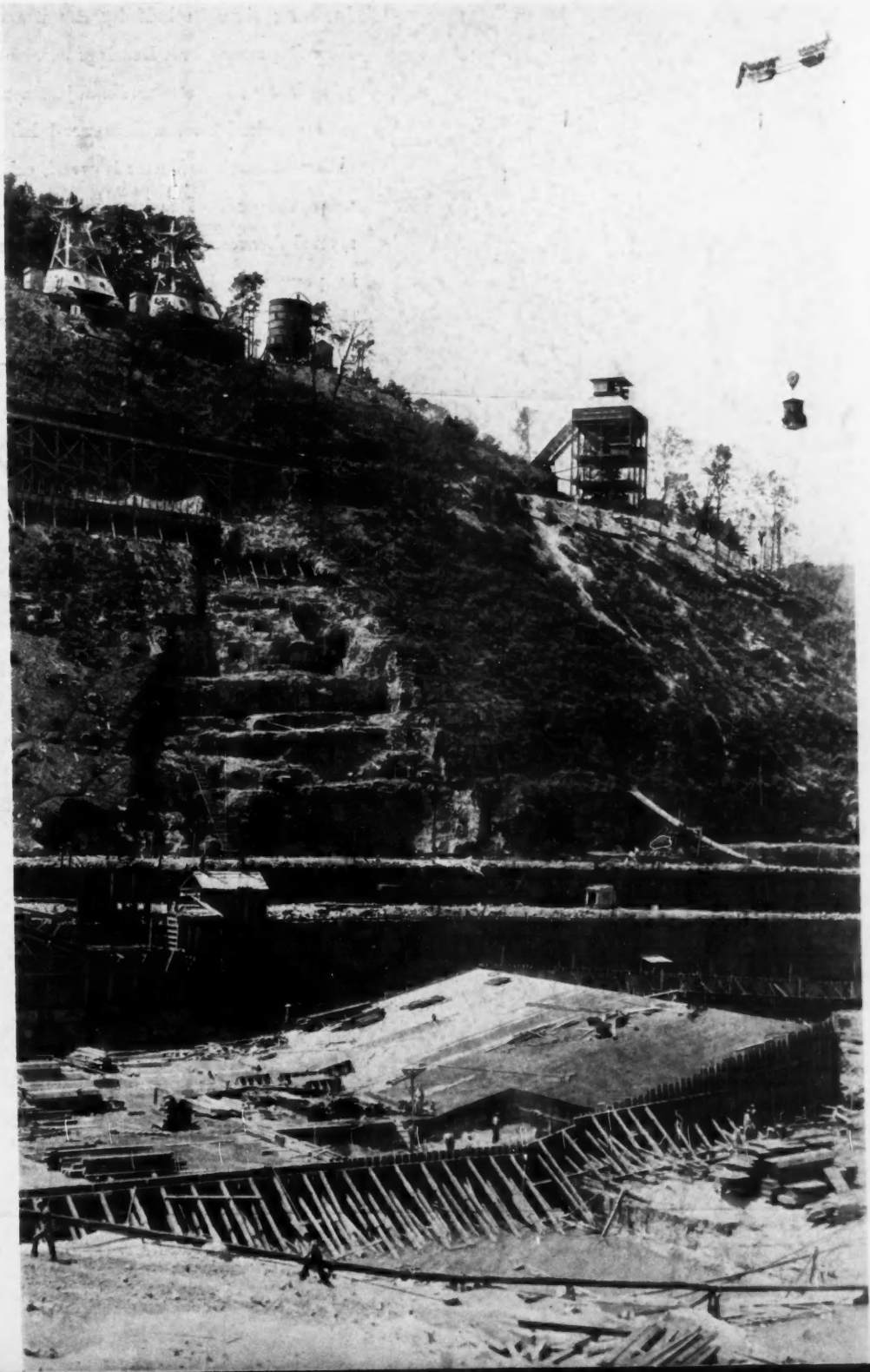


Rectifying Old Main Highway

lice Models Used in am Studies

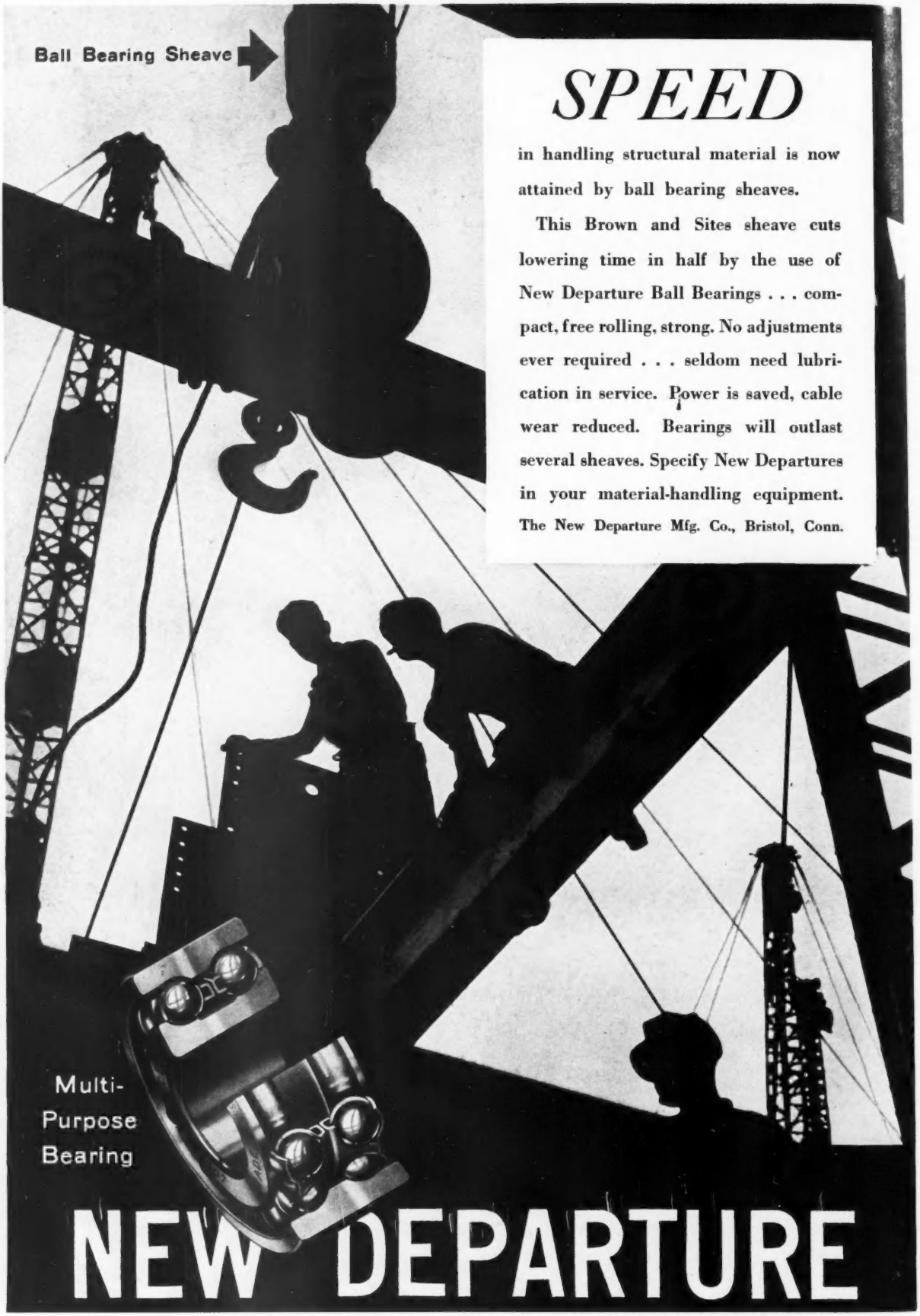
ntersections on St. Louis Belt Road

Norris Dam Concreting Facilities

Denver Water From Across the Divide

Well Points Supply Pool Sea Water

Bringing concrete to Norris Dam via industrial rail cars and cableway from the mixing plant set high above the Clinch River Valley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Give Private Housing a Chance

DURING the last few days the country has been treated to another of those intra-administration spats that tend to obstruct our progress toward national recovery.

When Mr. Ickes and Mr. Moffett clash over the merits of their respective housing programs, they may put on an entertaining show, but they are not contributing to recovery. And if their differences are but blanketed and left to smolder, they may become an even greater menace to that essential objective. It is to be hoped that the President will clarify this issue promptly and define the administration policy; otherwise the performance is bound to prejudice the newly-developed entente between government and business.

The objectives of a sound public works policy never have been set forth more clearly than by Marriner S. Eccles, Utah banker, newly appointed Governor of the Federal Reserve Board. He describes three possible policies for the administration as follows:

> "The first is a defeatist one of admitting that we must have people on the dole and providing for them. The second is to balance the budget, eliminate heavy government expenditures and allow business to take up the load. The third is to prime business by a great government public works program.
>
> "The President has said clearly that he does not intend to accept the defeatist policy. The second, that of balancing the budget and letting business take up the full load now would lead, many believe, to the danger of deflation. It seems to me that we should have a government spending program and do through collective activity what industry cannot do individually.
>
> "A spending program serves a dual purpose. It provides new employment and at the same time revives business activity. The money spent on the public works projects would be new income, and as it moved back through industry there would be a multiple expansion. It should not be the intention of the government to disturb or compete with private business, and spending would decrease as private business took up the load."

Mr. Eccles then points out what this page has so often emphasized, that the success of any further public works program will depend upon the continuity of substantial and rapid spending in order to provide a large initial and sustained business increase. He believes that "the vast increase in sales, production and profits would more than offset any curtailment of private investment that might result from any possible adverse effects that large expenditures might have on capital markets."

Under these specifications, it is plain that interference with the normal resumption of private investment must be avoided. We cannot stimulate private enterprise by supplanting it, smothering it or unfairly competing with it.

This is no place to discuss in detail the merits of Mr. Ickes' housing program. It is quite likely that many cities would be the better for a substantial measure of slum clearance and for new housing at rents lower than can be offered by private enterprise. It is possible also that social welfare may require the provision of such facilities under public auspices regardless of the interests or fears of real estate operators. Those fears, in fact, may be either well- or ill-grounded.

But under present conditions and in the light of the last year's experience, it is unlikely that Mr. Ickes' housing program can generate enough industrial recovery to outweigh the risk of nipping in the bud a revival of privately financed housing under the Federal Housing Administration.

It is too soon to appraise the success of this FHA program as a recovery measure. But private enterprise has been begging government to hold off and give it a chance. It has selected housing as a most immediate and promising field of operation. It is but reasonable to give it this chance without complicating or competitive activities by other governmental agencies.

In many directions Mr. Ickes has ample scope for the building of genuine public facilities that will add to the wealth of the nation, will not compete with private initiative and that will, on the other hand, minister constructively to many forms of private enterprise. It is the part of wisdom for the time being to concentrate public works activities and expenditures on such projects and to secure to private initiative the opportunity it seeks in the housing field.

Willard Chevalier

ENGINEERING NEWS-RECORD

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In the News:

OUT OF A HAT was drawn the name of the company to receive the award of a $1,180,400 steel contract for the Grand Coulee Dam after five bidders had submitted identical figures for this 21,000-ton order of sheet piling to the Bureau of Reclamation.

THE PENNSYLVANIA SOCIETY OF PROFESSIONAL ENGINEERS has voted to join the National Society of Professional Engineers. There are now five member state societies: New York, New Jersey, Connecticut, Illinois and Pennsylvania.

A $4,755,000 NEW HIGHWAY LINK between Boston and Lowell, bypassing population centers, has been recommended by the Massachusetts Department of Public Works in a special report to the legislature.

A JOINT BID of $1.40 per barrel of cement was submitted by four companies in southern California to the Metropolitan Water District for the 5,000,000 bbl. needed for the aqueduct project.

HARLOW S. PERSON, New York, economist and professor of administration and management, has been appointed acting director of the water resources section of the National Resources Board and acting chairman of the Water Planning Committee, to succeed Morris L. Cooke, resigned.

A FEDERAL JUDGE IN ALABAMA states that the Tennessee Valley Authority is acting in violation of the Constitution in its regional-development, power-generation and sales-development programs. Following close upon the announcement of the Edison Electric Institute that it expected to attack the constitutionality of the act creating the TVA, this statement of Judge Grubb indicates that the Supreme Court soon will have to decide how far the federal government may go in carrying on a multitude of activities under the guise of aiding interstate commerce.

VARIOUS PLANS to set up more river-development authorities paralleling the TVA are predicted when Congress meets. Already suggestions for establishing similar programs on the Missouri and the Arkansas rivers have been advanced.

In This Issue:

MAJOR OPERATIONS occasionally are necessary to correct a bad condition. Such was the case with the old road from Pittsburgh north to Butler, Pa. No amount of ordinary improvements of the old road could make a modern trunk highway of it; it had to be rebuilt on a new and straightened alignment.

STUDIES OF "SLICE MODELS" of dams are among the newer methods of model studies employed in checking computations on the design of important dams. Methods used in tests on models of Boulder, Norris and Grand Coulee dams, as reported to the recent conference on model study, are given in a paper reproduced in this issue.

LONG DISCUSSED in the abstract as a highly desirable traffic aid, belt highways around large cities now are beginning to show their value in practice. Work on such a road around St. Louis has made rapid progress in recent years.

SPEED AND ACCURACY in obtaining the desired proportions have come to be recognized as essentials on any large dam-building operation. At Norris Dam they are obtained in a plant designed to turn out 180 cu.yd. per hour and shown by experience to be able to increase that output by 20 per cent. The operating crew consists of only six men.

FOR MANY YEARS Denver has considered the possibility of bringing water from west of the Continental Divide to supplement the limited water supplies of the east slope. The pioneer tunnel driven through the divide to facilitate construction of the Moffat railway tunnel provides a channel under the crest, and now the PWA is putting up the money to build the diversion dams and other structures needed to bring water from the Colorado River Basin into the valley of the South Platte.

WELL POINTS driven into the sands of the beach at Fort Monroe provide a large swimming pool with water free from sediment and forms of fish life that have made swimming in the open sea off Fort Monroe almost impossible.

IS THE CONSTRUCTION CODE a help or a hindrance to the construction industry? That and related questions intended to bring out some constructive criticism of the code were put to a large number of contractors by *Engineering News-Record* recently. The first group of replies to be received is summarized in this issue.

Coming Articles:

FIFTY MILES of tubular steel were required for the 555-ft. scaffold which was built to permit cleaning and repairing of the Washington Monument. From the time the plans for the scaffold were approved, it was completed in 35 working days. The size and height of the tower necessitated special problems in design, including windbracing and the specification requirement for a passenger elevator. The scaffold design and erection will be covered in an article to be published soon.

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ENGINEERING NEWS-RECORD

December 6, 1934

FIG. 1—PAVING GANG AND PLANT at the producing end of the train of operations for straightening and widening the main road from Pittsburgh to Butler, Pa.

Rectifying an Old Main Road Out of Pittsburgh, Pa.

An impressive example of modern methods of line relocation and wide pavement construction in renovating old main highways

A NEW TRUNK HIGHWAY, involving extensive relocation and the longest continuous stretch of three-lane concrete pavement in Pennsylvania, has recently been opened for traffic from the city limits of Pittsburgh north *27* miles to Butler, Pa. Nearly 13½ miles of this road has been constructed this year, employing a plant of notably modern equipment units and presenting praiseworthy production records as a result of effective plant management. The remaining half of the total mileage was constructed in several sections in 1930, 1931 and mostly in 1933. The work was made exceptional by an unusual variety of heavy operations for grade-crossing elimination, stream diversion and railway relocation. The total *27*-mile operation included more than 1,000,000 cu.yd. of grading and 450,000 sq.yd. of reinforced-concrete paving and cost about $2,000,000. Altogether it typifies excellently the present order of the day in undertaking radical line rectification at heavy expense when revamping main highways out of large cities.

Real rectification planned

The old road, paved about fifteen years ago and following generally the original alignment, was a rather crooked affair twisting through Pine Creek Valley and taking the easiest way to the Butler County line; in Butler County it departed widely from a direct route, and curves were numerous. As an illustration, in one 8-mile section of the Allegheny County half of the road there were more than 50 curves, some of them being sharper than 40 deg. In Butler County the alignment was almost as bad. On the old road the paving was black top on a 6-in. concrete base and was only 18 ft. wide, except about 3 miles of old 7:5:7-in. reinforced concrete 16 ft. wide.

None of these conditions satisfied in the least successfully modern traffic requirements. Traffic had grown to about 3,000 vehicles a day, and 500 of them were heavy trucks and buses. Speeds could not be kept up, the old-time black top was slippery, and the pavement did not give adequate travel width. Moreover, a thin black top on a 6-in. concrete base was piling up maintenance expenses too fast under loads for which it had not been designed. A reconstruction program was indicated in a pressing manner, and it was boldly decided to make it true rectification (making right) in all aspects. This meant wider right-of-way up to a 70-ft. minimum, wider pavement and, above all, a new alignment, all of which meant blotting the old road out of the picture except where it happened to fit into the new route. This is what the new road virtually does.

The Allegheny County part (about 13 miles) of the new road presented a problem in taking out alignment obstacles rather than any radical changing of route. This situation is clearly indicated by the old and new route map (Fig. 2). Actually very little of the old road location was retained, but in no place did the new line depart far from the old line. Also the heaviest tasks of relocation lay in the southern half of the route. Here the road is along the gorge of Pine Creek also occupied by tracks of the Baltimore & Ohio Railroad and of course by the waters of the stream. The road, the railroad and the stream intersected or crowded close onto each other at several places, and it required close cooperation between the railroad company and the state highway department to unsnarl the tangle. The main operations are indicated on the map Fig. 2.

FIG. 2 — RELOCATION in Allegheny County was a problem of line-straightening, with extensive readjustments of stream, railway and road locations.

Details of the work are unimportant except to observe that it called for heavy earthmoving by both the railway and the state highway department. On the total 13⅓ miles of road to the Butler County line the grading amounted to 655,483 cu.yd., or about 50,000 cu.yd. a mile. The paving totaled 219,914 sq.yd. of 10:8:10-in. slab 30 ft. wide. The total cost was $1,173,301, or about $88,000 a mile.

Butler County work plan

In Butler County, which was the field of this year's operations, the new route made more complete departures from the old road as shown by Fig. 5. In mileage 80 per cent of the line was relocation. Except in the vicinity of Butler there are no curves exceeding 4 deg., and in 12 miles of line beyond the city area there are only thirteen curves. The country being rough, the grades run rather steep up to nearly 9 per cent in a few places.

The design of the roadway and pavement is shown by Fig. 7. Except at places where present street layouts prevent, the minimum right-of-way is 70 ft. plus additions for slopes. It is to be noted in the pavement design that the edge thickness of 10 in. tapers to 8 in. at a distance of 10 ft. from the edge or at a longitudinal joint. The center slab is uniformly 8 in. thick. The longitudinal joints in this case are cleft joints with premolded filler as shown by Fig. 7A. Traverse joints, as shown by Fig. 7B, are placed at maximum distances of 152 ft., at breaks in profile to vertical curves and at the ends of the day's work. In remaining respects the pavement is state standard bar mat and corner-bar construction for a three-lane concrete structure.

Construction of the road as described here relates only to the methods and equipment used on the main contract for 12 miles.

Grading—While grading volumes ran fairly high (about 40,000 cu.yd. a mile)

FIG. 3—TYPICAL EXCAVATION with power shovels and truck haulage on 1934 grading operations in Butler County.

FIG. 4—FILLS CONSTRUCTED IN LAYER by bulldozers and rollers in 1934 grading in Butler County.

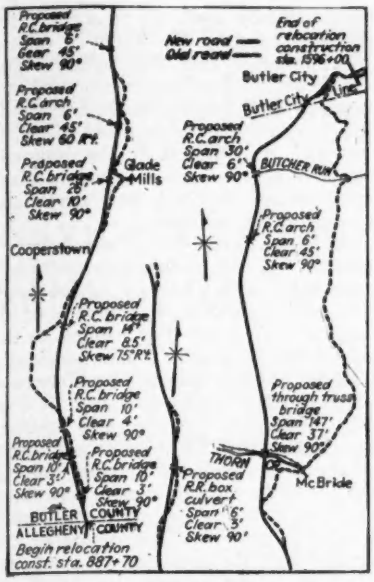

Proposed R.C. bridge Span 6' Clear 45' Skew 90°
Proposed R.C. arch Span 6' Clear 45' Skew 60° Rt.
Proposed R.C. bridge Span 28' Clear 10' Skew 90°
Coopersiown
Glade Mills
New road
Old road
End of relocation construction sta. 1516+00
Butler City
Butler City
Proposed R.C. arch Span 30' Clear 6' Skew 90°
BUTCHER RUN
Proposed R.C. arch Span 6' Clear 45' Skew 90°
Proposed R.C. bridge Span 14' Clear 8.5' Skew 75° Rt.
Proposed R.C. bridge Span 10' Clear 4' Skew 90°
Proposed through truss bridge Span 147' Clear 37' Skew 90°
Proposed R.C. bridge Span 10' Clear 3' Skew 90°
Proposed R.C. bridge Span 10' Clear 3' Skew 90°
THORN
Proposed R.R. box culvert Span 6' Clear 5' Skew 90°
McBride
BUTLER COUNTY
ALLEGHENY COUNTY
Begin relocation const. sta. 887+70

FIG. 5—RELOCATION in Butler County involved wider line changes and considerable shortening of route and reduction of curvature.

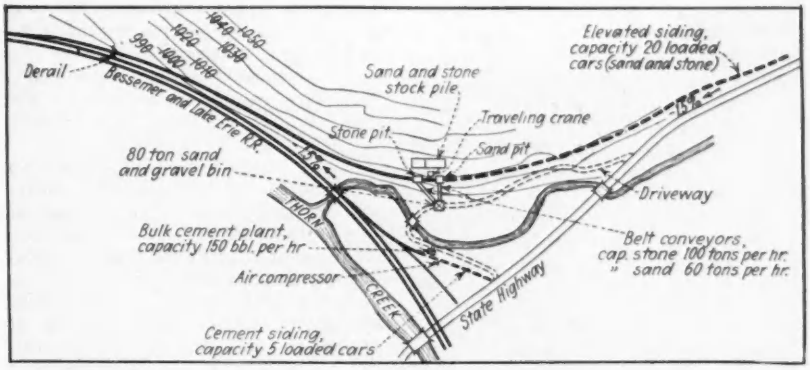

Derail
Bessemer and Lake Erie R.R.
Sand and stone stock pile
Elevated siding, capacity 20 loaded cars (sand and stone)
Traveling crane
Stone pit
Sand pit
80 ton sand and gravel bin
Driveway
THORN
Bulk cement plant, capacity 150 bbl. per hr.
Belt conveyors, cap. stone 100 tons per hr. " sand 60 tons per hr.
Air compressor
CREEK
State Highway
Cement siding, capacity 5 loaded cars

FIG. 6—MATERIALS-PLANT ARRANGEMENT for mechanical batching and charging batch trucks.

they called for no equipment or procedure out of the ordinary. In general, cuts and fills were arranged so as to balance closely with an average haul of about 1,500. Not more than 5 or 6 per cent of the yardage was rock. The natural set-up was for a light power-shovel and truck-haulage operation, although one or two of the cuts offered depths and volumes warranting perhaps larger-capacity units. With prevailing conditions in mind, the contractor put six 1¼-cu.yd. shovels onto the work with a fleet of 41 trucks, of which 11 were 3½ cu.yd. and the others smaller. This outfit averaged over the period when all the units were required about 6,000 cu.yd. a day.

On the sections where the fill was placed in layers, bulldozers and rollers were used. A fair indication of the grading operations is given by Figs. 3 and 4, but there were instances of 40,000-cu.yd. cuts and fills of 28,000 cu.yd. In all, however, the shovel and truck fleet handled the work.

Fine grading operations

Fine grading presented no novelties beyond the organization of the work. At the beginning of the paving a night gang was organized to fine-grade the full width and clear the way completely for paving operations during the day. A gas-electric lighting plant of 6,500 watts was provided for the night work. Rain, however, worked against this plan; occurring more commonly at night, it kept the grading crew from working, and night operations left the fine grade too long exposed to damage by subsequent night or day showers. As a remedy the crew was reorganized for grading by day, working on half the width and leaving the other half clear for batch trucks. As will be noted from Fig. 7, the design called for a crowned subgrade. This was fine-graded ½ in. high, leaving the final cut to be made by a subgrade planer pushed ahead of the mixer and checked by a scratch templet.

Concreting Plan—With 12 miles of 30-ft. pavement to build, or materials for about 50,000 cu.yd. of concrete to be handled, only one economic location existed for the proportioning plant. This was at the village of McBride (Fig. 5), where a double-track railway crossed the old road about ½ mile east of the new road, 3 miles from the north end and 9 miles from the south end of the new road.

As will be observed, the new location virtually eliminated from road service the southern 9 miles of the old road, requirnig a long detour. To reduce the detouring period as much as practicable, construction was begun at the south end; this reduced the detouring period about six weeks. Then construction was begun at the north end and carried south.

FIG. 7—PAVEMENT DESIGN for the new three-lane trunk highway from Pittsburgh to Butler, Pa.

Mechanized materials handling

The nucleus of plant operations for receiving materials and dispatching them out onto the grade was at McBride. Here spurs of the railway were extended to form car-storage sidings, one for cement and one for aggregates, as shown by Fig. 6. Between these sidings were located the aggregate and the cement batching plants, both surmounting the batch-truck driveway, as shown by Figs. 8 and 9.

As indicated by Figs. 6 and 8, the aggregate handling from cars to batching bins was a simple familiar arrangement. An aggregate-delivery and car-spotting arrangement of some novelty was adopted, however. By arrangement with the shipper the cars were spotted in train alternately: a 60-ton sand car and a 90-ton coarse-aggregate car. This arrangement corresponded with the ratio in which the two materials were consumed. It permitted also both sand and stone to be discharged simultaneously into the two track hoppers in proportion to the batching-plant capacity, which was nominally 100 tons of stone and 90 tons of sand per hour.

The cement-batching plant was a proprietary device. As shown, bulk cement in hopper-bottom cars was discharged into a track hopper that fed to a horizontal screw conveyor feeding to a vertical screw conveyor. At its top the vertical conveyor delivered into the batching pipe, or the surplus delivered

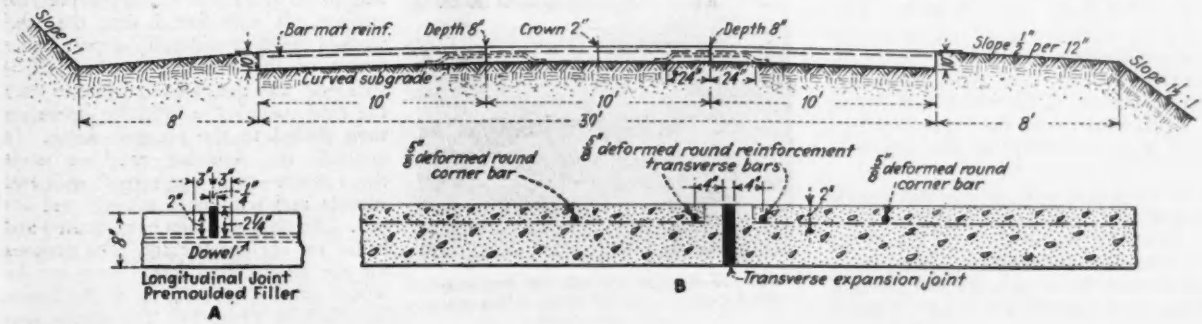


FIG. 8—AGGREGATE-BATCHING PLANT charged by belt conveyors from separate track pits for sand and stone.

into a pipe to the double-cone storage tank, which also could feed back into the horizontal conveyor. A vibrator was attached to the batching pipe to prevent clogging, and a 40-lb. air nozzle was used in the cement car to keep the discharge steady.

The marked feature of materials handling was the degree to which operations were mechanized and synchronized. None of the equipment units, while they were modern, departed from commonly available factory products, but every operation was by machine. Also the mechanical operations were synchronous. To illustrate, the aggregate batching plant had 40-ton bin compartments —that is, they stored less materials than were required for half an hour's batching. So for uninterrupted batching, sand and stone cars had to be simultaneously brought to and pulled from over the track hoppers regularly enough to fill the batcher bin compartments at least every 30 min. Similarly the bulk-cement batcher had to be operated on the basis of direct movement of material from the car to the batching pipe with reserve-tank storage only enough to allow for prompt replacement of unloaded by full cars. Incidentally the batch-truck schedule had to be accurately timed.

Paving plant and methods

The decision was made to concrete the 10:8:8:10-in. slab full width. This called for large mixer capacity and wide-span finishing machines, subgrade planers and templets. Also, because of the 9-mile haul to the mixer at the start, a large batch-truck fleet was required. The plant assembly at the mixer is shown by Fig. 1.

The concrete mixture proportioned by weight corresponded to a volume ratio of about 1:2:3½, considering 94 lb. of cement as 1 cu.ft., 206 lb. of sand (which compensates for a theoretical 3 per cent of moisture) as 20 cu.ft., and 315 lb. of ⅜- to 2¾-in. stone as 3½ cu.ft. Stone calculations were based on average specific gravities of different rock as determined by the highway department laboratory. The cement factor as determined by the department engineers for this work was 4.7979 bags per linear foot of pavement. This is the theoretical factor, and it was determined as one of the methods regularly employed to allow department engineers to check volumes actually used. It is one of four methods used by the highway department to make sure that sufficient materials are used in construction and that required depth is secured. Other methods are to check all invoices and material received, to check daily the subgrade templets and the screeds, and to make core borings to check both depth and quality of the concrete.

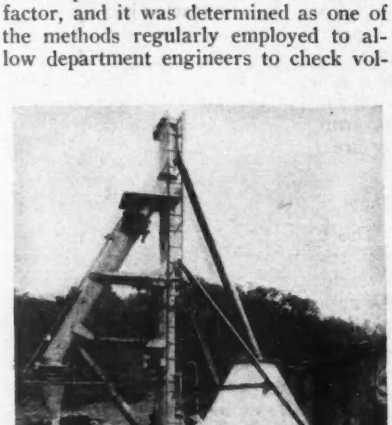


FIG. 9—BULK-CEMENT batching plant charging cement containers on batch trucks.

FIG. 10—BATCH TRUCK with two one-batch compartments and tilting cement containers with covers.

Hauling Plant—Using six bags of cement and the proportions indicated, each batch with 24 to 25 gal. of water produced 26.39 cu.ft. of concrete, or almost a cubic yard. For hauling to the mixer, the 30 smaller trucks previously used in grading were converted into two-batch capacity trucks, as shown by Fig. 10. Materials for the two batches weighed about 7,500 lb. The equipment of the trucks calls for mention only in respect to the separate cement containers specified. These were lidded steel boxes hinged to turn over and discharge the cement with the aggregate. To prevent blocking of the aggregate flow on an an upgrade delivery, the contractor welded bracket legs to the boxes to hold them clear of the truck bottom. All 30 trucks were required on the long haul of 9½ miles; this number was gradually reduced to 15 on a 3-mile haul.

Mixing and Placing Concrete—To meet the mileage production requirements on a 30-ft. pavement, the contractors adopted a dual-drum paving mixer. For this machine the engineers set a mixing period of 88 sec. from skip-up to discharge. This period included time of transfer between drums and 4 to 5 sec. for emptying the skip. As indicating output, the following official notes are given:

Started to pave June 13, 1934.
Completed paving Oct. 12, 1934, at 1 p.m. (four calendar months).
Contract length, 11.99 miles.
Working daytime charge, 70.75 days. This is on a basis of 5½ days a week. Holidays and Sundays exempt, but there was no Sunday paving.
Length, in feet, of project, 63,283 + 70.75 = 894.4 ft. per working daytime charge.
Total paving hours entire project, 1072.24.
Actual paving hours entire project, 937.11.
Delay time during paving operation, 135.13 hours.
Number of batches in total project, including pavement and end walls, 55,821.
Batches per actual paving hours, 59.56.
Batches per total paving hours, 52.06.

The placing equipment was conventional except for its unusual across-slab spans, but an uncommon procedure was followed in placing the slab reinforcement. This was 16x9½-ft. bar mat specified to be located 2 in. below the slab surface. It was found that the steel worked down considerably depeer under action of the finishing machine. The strike-off was then adjusted just to bury the steel, which the finishing operation then settled to the planned depth. In general, the finishing machine made three passes—with one screed, with two screeds and with both screeds and the belt. The slab was then hand-floated and belted for surface texture. The grooves for the longitudinal joints were cut by wheels carried on the rear of the finishing machine (Fig. 1). The curing was

done with burlap and wetted straw.

The specifications called for a 550-lb. modulus of rupture on seven-day test beams. At this or a little higher strength the pavement was opened in fourteen days; with much higher strengths the opening period was reduced to eleven days. Beams broken at eight days showed moduli ranging from 675 to 700 lb.

The project was carried out under the direction of Samuel Eckels, chief engineer, Pennsylvania department of highways.

The contractor for the construction operations described here was the York Engineering & Construction Co., York, Pa.

Advice for Contractors Entering Government Work

V—Terms of Payment Hold Strictly to Law

In four previous articles the contractor has been warned: so fully do law and contract govern that errors and unforeseen conditions provide scant excuse for relief action

By Howard L. Jones
Cherrydale, Va.

IT IS A PROVISION of the standard government construction contract that, unless otherwise provided in the specifications, partial payments will be made as the work progresses at the end of each month on estimates made and approved by the contracting officer. In making these payments 10 per cent of the estimated amount is to be retained until final completion and acceptance of the work. Material on the site of the work may be taken into consideration in preparing estimates for progress payments. The cost of a performance bond required by law to be given by the contractor is not authorized to be regarded as a part of the cost of work done or material delivered in computing the monthly estimates on which partial or progress payments are made.

Retained percentages

It has been held that under a contract authorizing the withholding of a stated percentage until final acceptance of the contract work, there is no authority of law for the payment of the amount to the contractor upon the substitution of a surety bond guaranteeing the correcting of any defects in the work.

Where a contractor defaults in the performance of his contract and the work is completed by the United States, the amount of the retained percentages, in excess of what is necessary to reimburse the government for its expenditures in completing the work, may be paid to the contractor. It has been held that the amount retained by the government under one contract may be used to liquidate the contractor's indebtedness to the United States on another contract.

It is held that both under the general rules of law as well as the standard construction contract a contractor is required to complete at his own expense any project that is damaged before acceptance, even though such damage is due to an earthquake or other cause not the fault of the contractor.

In a case in which during the progress of the work one of a group of uncompleted buildings was wrecked and partly destroyed by an explosion not the fault of the government, it was held that the United States was entitled to have the building reconstructed and completed in accordance with the terms of the contract, without additional compensation, before the other buildings could be paid for—the contract having been let on the basis of one project.

In a case in which the public necessity requires the acceptance of inferior performance, or the inferior performance will meet the actual need of the United States, such performance may be accepted after the contractor has agreed to proper deductions from the contract price. Where a contract provides that title would not vest in the United States until final inspection and acceptance, the government is not liable for destruction by fire before acceptance.

Additional payment

The United States as a contractor is not responsible for its acts in its sovereign capacity, and under existing law appropriations are not available for making payments in excess of the compensation stipulated in the contract, even though an increase in the cost of performance may be due to subsequently enacted statutes.

Where a contract for the doing of certain work provides for the payment of a bonus for every day saved in completing the work within the stipulated period, and part of the work is eliminated, the contractor is not entitled to such bonus for the time that would have been consumed in doing the eliminated work. Where a contractor under a government contract is performing the contract work through subcontractors who default and delay the work, there is no legal liability upon the United States to pay any amount as additional cost to the contractor.

There is no authority under the standard contract to adjust the contract price because of the change of wage rates in accordance with the Act of March 3, 1931, providing for the payment of the local prevailing rate of wages. The new emergency Public Works Administration contract contains a provision that any increase in the wage rate may be made up to the contractor.

In the absence of specific statutory authority therefor, the United States may not be obligated to pay interest on the amount of an invoice not paid promptly or within a specified time. In a case in which the contractor was notified that it would be impossible to make any more payments until further funds had been appropriated, it was held that the government had the undoubted right to stop the performance of the work at any time for proper cause without liability except for granting additional time for completion; as there was no authority of law for the payment of interest or damages, no additional amount could be allowed. The deferring of contract payments beyond due dates because of insufficient appropriations will not obligate the United States to pay carrying charges or interest thereon.

Liability of government

It has uniformly been held that no officer of the government is authorized to enter into a contract whereby the United States is made to assume liability in an indefinite amount for any damage or injury to persons or property. In a case in which a contract provided for the payment of liquidated damages for delays by the contractor and for an extension of time only if the work was delayed by the government, it was held that the liability of the government extended only to an extension of time, and that payment of damages by the United States for delay was unauthorized.

In a decision of the Supreme Court of the United States, 270 U. S. 4, it was said that:

> * * * The only reference to delays on the government side is in the agreement that if caused by its acts they will be regarded as unavoidable * * *. The plaintiff agreed to accept in full satisfaction for all work done under the contract the contract price reduced by damages deducted for his delays * * *. The plaintiff's time was extended, and it was paid the full contract price. In our opinion it is entitled to nothing more.

Dam Stresses and Strains Studied by Slice Models

Laboratory tests of maximum cantilever sections of Boulder, Norris and Grand Coulee Dams indicate that this type of model has a distinct usefulness as an adjunct to design

By J. L. Savage

Chief Designing Engineer, Bureau of Reclamation, Denver, Colo.

AMONG THE PAPERS given at the model-study conference held in connection with the annual meeting of the Society for the Promotion of Engineering Education at Cornell, one by Mr. Savage reviewed the work of the Bureau of Reclamation on dams. The first part of this paper was devoted to the development of plaster-celite and rubber-litharge models and their use in verifying the mathematics of the trial-load method of analysis for arch-gravity dams developed by engineers of the Bureau. Most of this information was presented by Mr. Savage and Ivan E. Houk in their article on the Boulder Dam model studies (*ENR*, April 7, 1932, p. 494); but the second part of the paper, referring to slice models as distinct from three-dimensional models, was wholly new. For that reason it is presented here in its entirety, as describing a further and significant refinement in a remarkable dam-development program. —EDITOR.

AN INTERESTING outgrowth of the intensive program of model testing that has been under way at the Bureau of Reclamation's experimental laboratory at Colorado University, Boulder, Colo., during the past few years, is the testing of models of maximum cantilever sections or slices of several dams, notably Boulder, Grand Coulee and Norris.

It was determined from these tests of slices of dam models, that plaster-celite models of maximum sections of arch, arch-gravity and gravity dams are useful in determining load deflections, general stress conditions and special stress conditions at such locations as corners, galleries, etc. Also, it was found that such tests may give misleading stress curves in the foundation material due to the necessity of using rigid boundary conditions for the models.

Boulder Dam tests

Following completion of tests of a three-dimensional plaster-celite model of Boulder Dam (*ENR*, April 7, 1932, p. 494), a model of the crown cantilever section of this structure was built to the same scale (1:240) and of the same plaster-celite mix as the original model so that the elastic properties would be the same. A reinforced-concrete frame was built and the cantilever model mounted in it. Since a comparison was desired with the three-dimensional arch model which had been tested with a mercury line load (13.6 times as heavy as water), corresponding increases on the dead and live loads of the slice model were required. Therefore, the dead load was increased to 13.6 times 150 lb. per cu.ft. by suspending weights from steel pins embedded in the model. Live load of the magnitude determined for the crown slice by the trial-load analysis with the water surface at El. 1,232 was applied mechanically by means of a series of weights that were fastened with wires running over pulleys to bearing plates on the upstream face. The general arrangement of this model is shown in Fig. 3.

For comparison between the two plaster-celite models, movement of the downstream face of the center line of the cantilever model was measured and found to check very closely with that measured on the arch model. Five stresses were measured on the downstream face of the cantilever model with Huggenberger tensometers, and they were found to check very closely with the computed results obtained from the trial-load analysis of the arch model.

An extensive study of the concentration of strain at the juncture of the dam and the foundation was made with Huggenberger tensometers. Strain measurements also included observations with Tuckerman optical strain gages for strains at El. 950, 700, 500, 400 and 300. Horizontal, vertical and diagonal

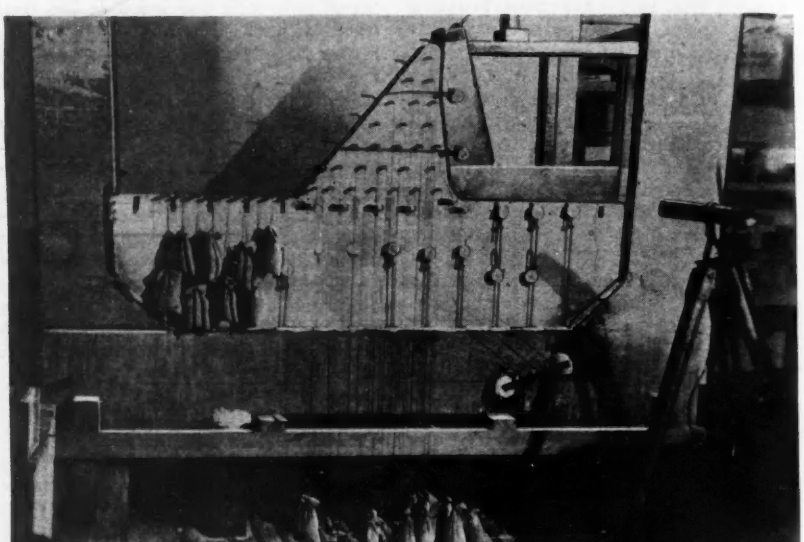


FIG. 1—SLICE OR SLAB MODEL of Grand Coulee Dam, a straight-gravity type, as set up in the laboratory. Live load of water is simulated by a bag of mercury held against upstream face by wood blocks. Required increased dead load is produced by lead weights hung from model.

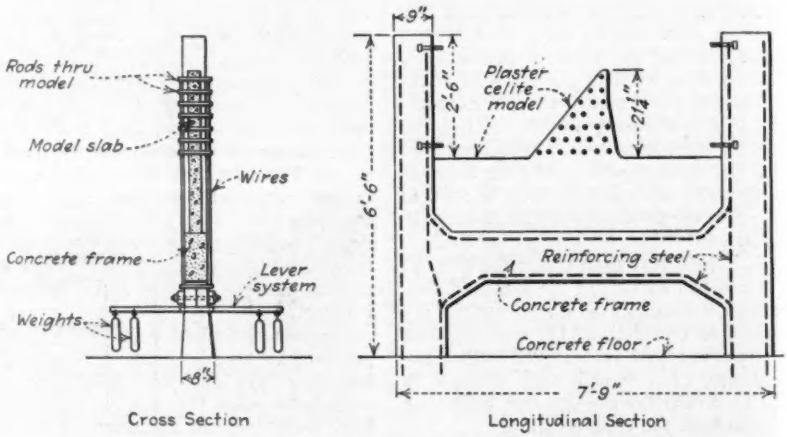


FIG. 2—GRAND COULEE DAM SECTION in testing frame, showing steel pins and lever system through which dead load was supplied. Scale of model is 1 in. to 20 ft.

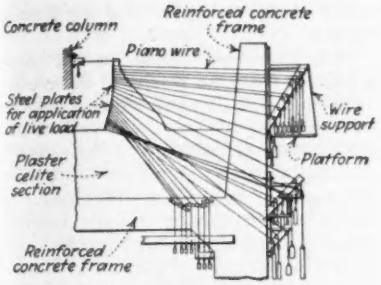


FIG. 3—ON THE MODEL of the crown cantilever sections of Boulder Dam, live loads were reproduced by a system of weights.

strains in two directions were measured, and the magnitude and direction of the principal stresses were calculated from these measurements.

The test program of this model is not complete. It is planned to investigate the stability of the section acting as a gravity dam without arch action. Deflection and strain measurements will therefore be repeated under the full-load condition.

Grand Coulee Dam

Tests on models of arch dams have shown that the elastic deformation of the foundations has considerable effect on the stress distribution within the structure. It was thought that this condition would also exist in a straight gravity dam and that it could be investigated by the use of models. One of the sections chosen for this test was that of the Grand Coulee Dam for its maximum development. Fig. 2 shows the general arrangement of this model in its supporting frame, and Fig. 1 is a photograph showing the optical strain gages set for horizontal strains and the "Last Word" gages for deflection measurements.

The model section of this dam was constructed on a scale of 1 in. equals 20 ft. The model slab was rigidly supported in a reinforced-concrete frame. Mercury was used to produce the live load, and a wooden frame held the necessary rubber bag containing the mercury in contact with the face of the dam and the top of the supplemental base. This bag was connected by a rubber tube to a steel bottle that could be raised and lowered to give the desired mercury elevation.

Since a mercury live load represented an increase in specific gravity of 13.6 times the weight of water, it was necessary to increase the specific gravity of the dam 13.6 times the weight of con-

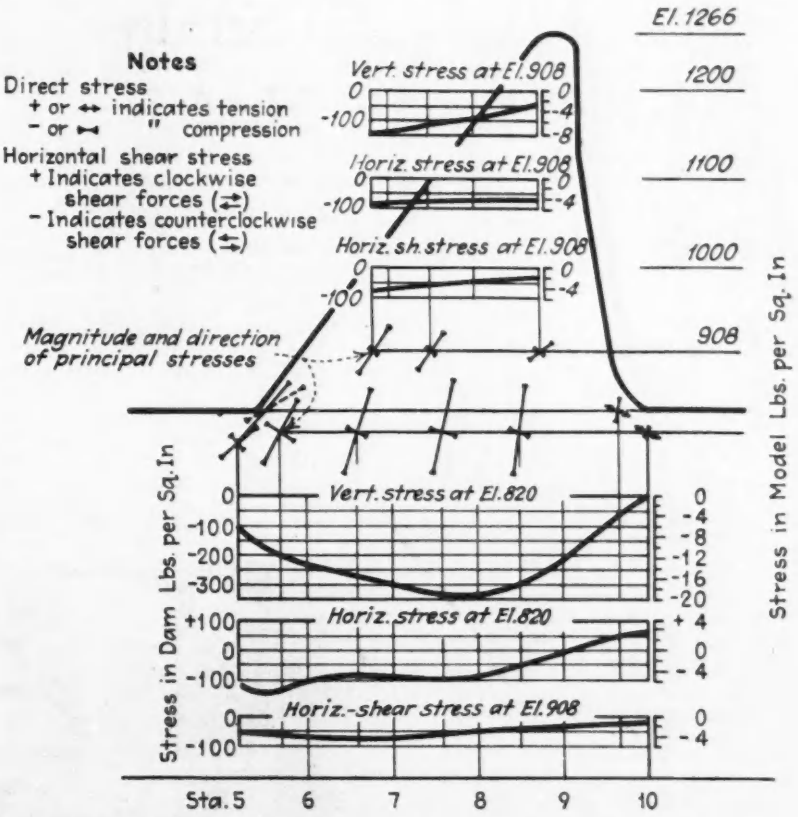
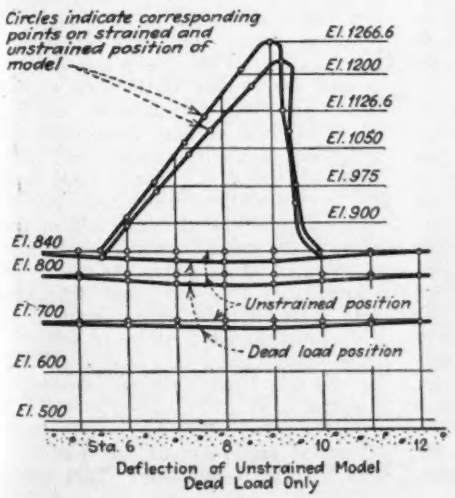
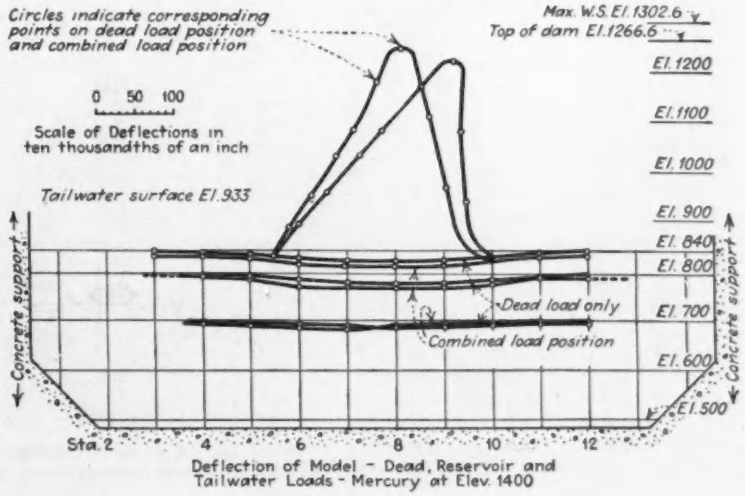

Notes
Direct stress
+ or ↔ indicates tension
- or ⟷ " compression
Horizontal shear stress
+ Indicates clockwise shear forces (⇄)
- Indicates counterclockwise shear forces (⇆)
Vert. stress at El. 908
Horiz. stress at El. 908
Horiz. sh. stress at El. 908
Magnitude and direction of principal stresses
El. 1266
1200
1100
1000
908
Vert. stress at El. 820
Horiz. stress at El. 820
Horiz.-shear stress at El. 908
Stress in Dam Lbs. per Sq. In
Stress in Model Lbs. per Sq. In
Sta. 5 6 7 8 9 10

FIG. 4—STRESSES OBSERVED in the slice model of Grand Coulee Dam, with mercury at El. 1,400, are converted directly to stresses in the prototype. Maximum dam stress under combined loads is shown to be about 350 lb. per sq. in.

FIG. 5—TWO deflection diagrams of Grand Coulee Dam slice model. Left diagram shows comparison between unstrained and dead-load positions, while in right diagram the position for deflection due to the combined effect of dead and water loads, uplift and earthquake forces is compared with dead-load deflection position.




Circles indicate corresponding points on dead load position and combined load position
Max. W.S. El. 1302.6
Top of dam El. 1266.6
El. 1200
El. 1100
El. 1000
El. 900
El. 840
El. 800
El. 700
El. 600
El. 500
0 50 100
Scale of Deflections in ten thousandths of an inch
Tailwater surface El. 933
Concrete support
Dead load only
Combined load position
Sta. 2 4 6 8 10 12
Deflection of Model - Dead, Reservoir and Tailwater Loads - Mercury at Elev. 1400

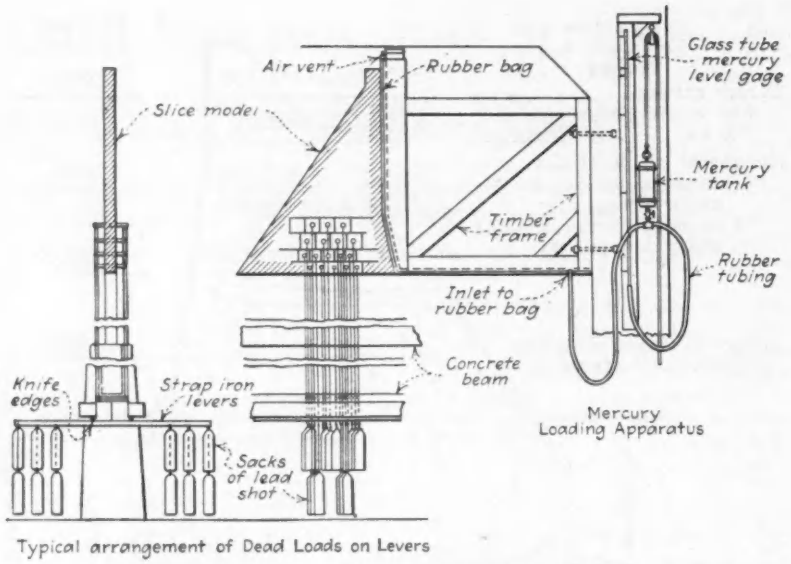


FIG. 6—TEST SET-UP of a plaster-celite slice model of Norris Dam, showing mercury apparatus for live loading and weights and levels for dead load.

crete. This increase in dead load was produced by lead weights acting through levers at the bottom of the concrete frame. The levers were connected by wires to steel pins extending through the dam model. The amount of load applied to each pin was made proportional to the volume of material around the pin. With this arrangement, when loads were applied to the model, the dead weight resisted the mercury load in the same proportion that a concrete structure would resist a water load.

In high dams the dead-load stresses are fully as important as the live-load stresses. Therefore, it was considered advisable to measure dead-load stresses separately from the live-load stresses. Measurements of deflection and strain were made on the model for dead load only, and also for the combined dead load, reservoir load and tailwater load for various elevations of the reservoir. Fig. 5 (left) shows the deflection of the unstrained model due to the dead load only. The circles in the figure indicate corresponding points on the strained and unstrained positions of the model of the dam.

"Last Word" gages, reading to 1/10,000 in., were used to measure deflections, and the Tuckerman optical strain gage, reading to 2/1,000,000 in., was used to measure strains. In the design of the dam the combined effect of weight, water pressure, uplift and earthquake forces was included. In the test of the model under live load the same position of the resultant force, as produced by these combined forces, was obtained by increasing the height of the mercury to El. 1,400. Fig. 5 (right) shows the deflection of the model under dead load only and under dead load, reservoir load and tailwater load, with the reservoir load at El. 1,400. The circles indicate corresponding points on the dead-load position and on the combined-load position.

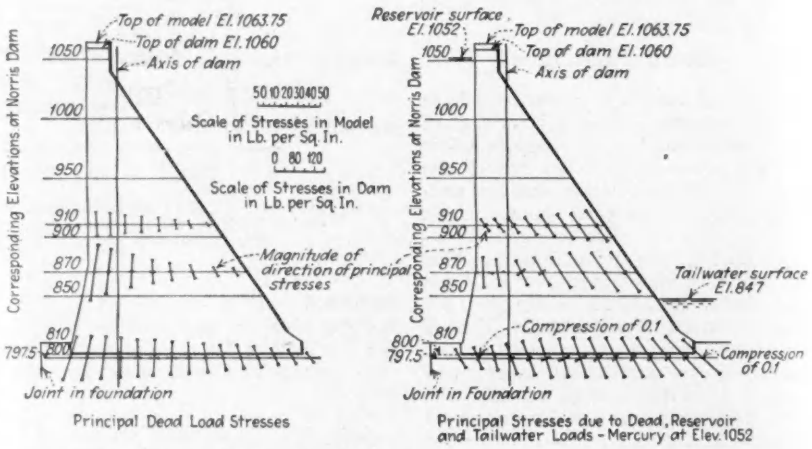


FIG. 7—PRINCIPAL STRESSES in Norris Dam as determined from strain measurements on the slice-model.

Deflection tests for the model give qualitative results only, because a section through the actual dam would be under lateral restraint from the remainder of the structure. This restraint would cause deflection of the dam to be slightly less than indicated by the model. However, deflection tests give a fair picture of the approximate deflections to be expected.

Stresses in the plane of the section are not affected by this lateral restraint, so they may be converted into stresses in the dam. Fig. 4 shows the stresses in both the model and the dam, due to dead load, reservoir load and tailwater load, with the reservoir load at El. 1,400. This loading gives the same position of the resultant force on the base as produced in the design of the dam by the combined effect of weight, water pressure, uplift and earthquake forces.

The maximum stress in the dam predicted from the results of these tests is about 350 lb. per sq.in., and no vertical tension was observed at the heel under full load. The results clearly indicate that the stress distribution at the base is not linear. However, the measured curves are concave upward, whereas curves calculated on the basis of an infinite elastic plate are concave downward. This difference, which is believed to be due to the rigid concrete boundary used in the model construction, is being investigated by further experiments and office analyses.

The investigation of Norris Dam is very similar to that of the Grand Coulee Dam except in the scale of the model. The Norris model was built to a scale of 1 to 60, giving a model 52 in. high on a supplemental base 48 in. deep and 8 ft. long. Fig. 6 shows the general arrangement of the model and the method of loading.

The proposed program of tests includes the following: Measurement of strains at the base of the dam and at two higher elevations, to determine the principal strains and stresses; special investigations of the strains and stresses around the corners at the base of the dam; and the measurement of the horizontal and vertical components of deflection of the foundation and both faces of the dam. Some study will also be made of the strains around the inspection gallery at the base and of the effect of the gallery opening on the distribution of stress along the base. A repetition of the strain and deflection tests with an uplift effect included is also contemplated. All tests will include observations for dead load and for the effect of combined dead and live load.

At the present time the measurement of strains and some of the deflection tests have been completed. Tuckerman

optical gages were used for the measurement of strain along the base and in the interior of the model. These gages read to 2/1,000,000 in. over a 2-in. gage length. For the measurement of strain along the face of the dam at the corners, Huggenberger tensometers reading to 1/100,000 in. over a ½- or 1-in. gage length were used.

Fig. 7 shows the principal stresses due to dead load alone and due to dead load, reservoir load and tailwater load, with the reservoir at El. 1,052. The direction and magnitude of the stresses are shown for both the model and the dam. The measured maximum principal stresses along the base are about 25 per cent less than the stress computed by the linear distribution method. At the corners where a ½-in. gage length was used, the stress concentration was about 30 per cent higher than the computed stress. Theoretically an infinite stress would occur at the corners, but this condition cannot be obtained because of the elastic limit of the material. Although no signs of failure were found at the corners of the model, some plastic flow was observed.

The principal stresses at the two elevations above the base show that the greater the distance above the base, the more nearly linear the stress distribution becomes, so that the upper portion of the dam acts as a cantilever beam.

The work herein discussed was conducted by Charles W. Fletcher, E. D. Smith, Frank M. Russell and James A. Stubbs, junior engineers, under the direction of A. W. Simonds, engineer, and Ivan E. Houk, senior engineer. All designing work of the bureau is under the general direction of the writer as chief designing engineer, and all engineering and construction work of the bureau is under the direction of R. F. Walter, chief engineer, with headquarters at Denver. All activities of the bureau are under the direction of Dr. Elwood Mead, Commissioner of Reclamation, with headquarters at Washington D. C.

Belt Road Being Built Around St. Louis

New Route 77, designated the Lindbergh Highway, forms a semicircle around city, tying together all highways from north, south and west—Four grade-separation structures built, others under way

IN ORDER to relieve St. Louis streets of through east-bound traffic and at the same time to distribute St. Louis-bound traffic around the outskirts of the city to the entrance most convenient to its destination, a new belt highway was laid out in 1931 and has been under continuous development since. Beginning at the Chain of Rocks Bridge over the Mississippi River north of the city, the new road extends 31.6 miles in a semicircle to a point south of the city. At present the whole route is graded to a 54-ft. width. For 10 miles the pavement width is 40 ft.; for 11.4 miles, 30 ft.; and for 10.2 miles, 20 ft. All structures are built with a 42-ft. roadway. Grade separations are completed at four intersecting routes, and plans are completed for the fifth one. The new road is designated as Route 77, or the Lindbergh Highway. St. Louis County is cooperating by paving a number of its roads that intersect the new highway.

Because of the value already demonstrated by the belt highway in solving the problem of traffic distribution around St. Louis, the St. Louis Regional Planning Association, in a recent report, recommended its extension into Illinois, to form a complete circle around the St. Louis-East St. Louis metropolitan area. Preliminary work on certain sections of this Illinois extension is already under way.

Recent work has concentrated on completion of the necessary grade-separation structures, to make the new road an express highway. The three main crossings on the north half of this route are in service. These are at the intersections of state route 99, of Natural Bridge Road, and of U. S. 40 numbered I, II and III on the accompanying map. Another is contemplated at Olive Street Road, one of the principal county highways. Of the three important intersections on the south half of the belt highway, plans are completed at U. S. 50. U. S. 30 is under consideration, while that at U. S. 66 (IV on the map) was completed last year. Plans still are indefinite regarding a grade separation at the south terminal of the belt highway, where it forms an intersection with U. S. 61.

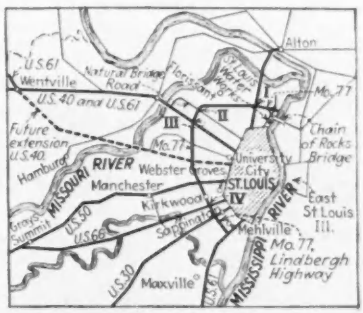


FIG. 1—ROUTE of Lindbergh Highway, the belt road around St. Louis that is being developed into an express highway to distribute incoming traffic to the proper city gateway. Roman numerals locate bridges referred to in text.

Each of the layouts of the four completed grade separations is different from any of the others, as a result of the local topography. Thus, as shown in Figs. 3 to 6, they vary from a perfectly formed cloverleaf through a circular layout to an elongated cloverleaf 1,300 ft. long covering nearly 10 acres of land.

FIG. 2—CONCRETE ARCH of filled-spandrel type, faced with native stone, carries the belt road over a small creek near Kirkwood.

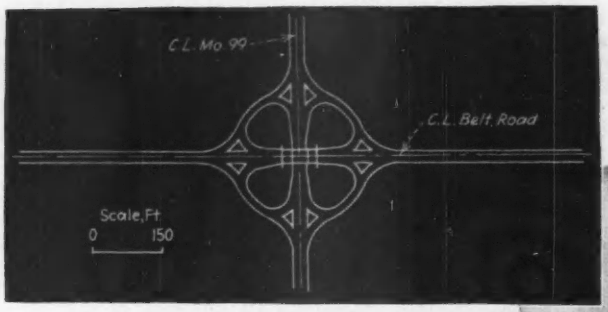
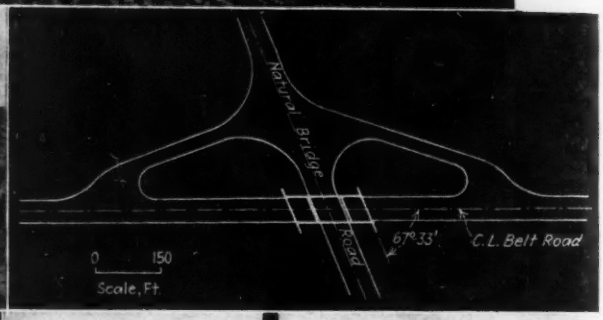
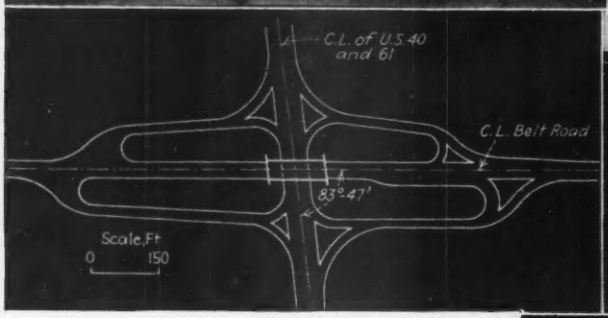


FIG. 3—THREE-SPAN concrete girder bridge with open abutments (location I on the map) is surrounded by a symmetrical cloverleaf connecting-road layout.

FIG. 4—SKEWED concrete girder bridge (below) and half-cloverleaf connecting-road layout at location II on the map.





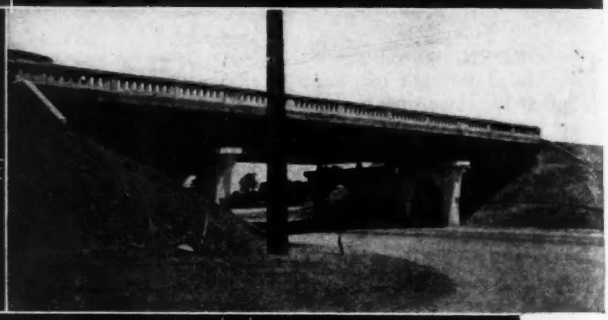


FIG. 5—CONTINUOUS steel girder bridge (above) at location III is encased in concrete and provided with an ornamental concrete railing. The connecting-road layout is an elongated cloverleaf.

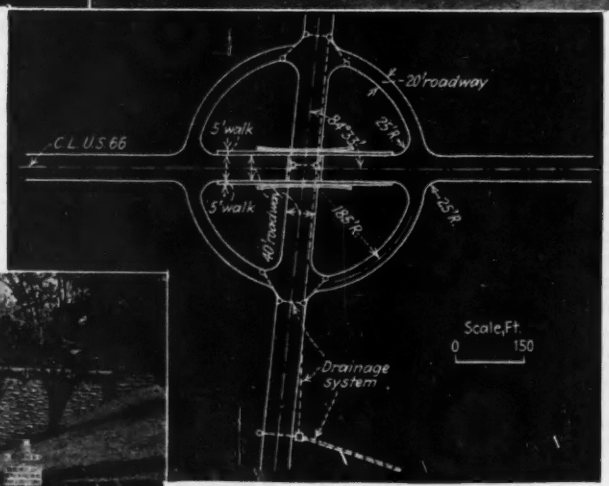


FIG. 6—STONE-FACED concrete rigid frame of barrel type at location IV. A circular layout of connecting roads is utilized.

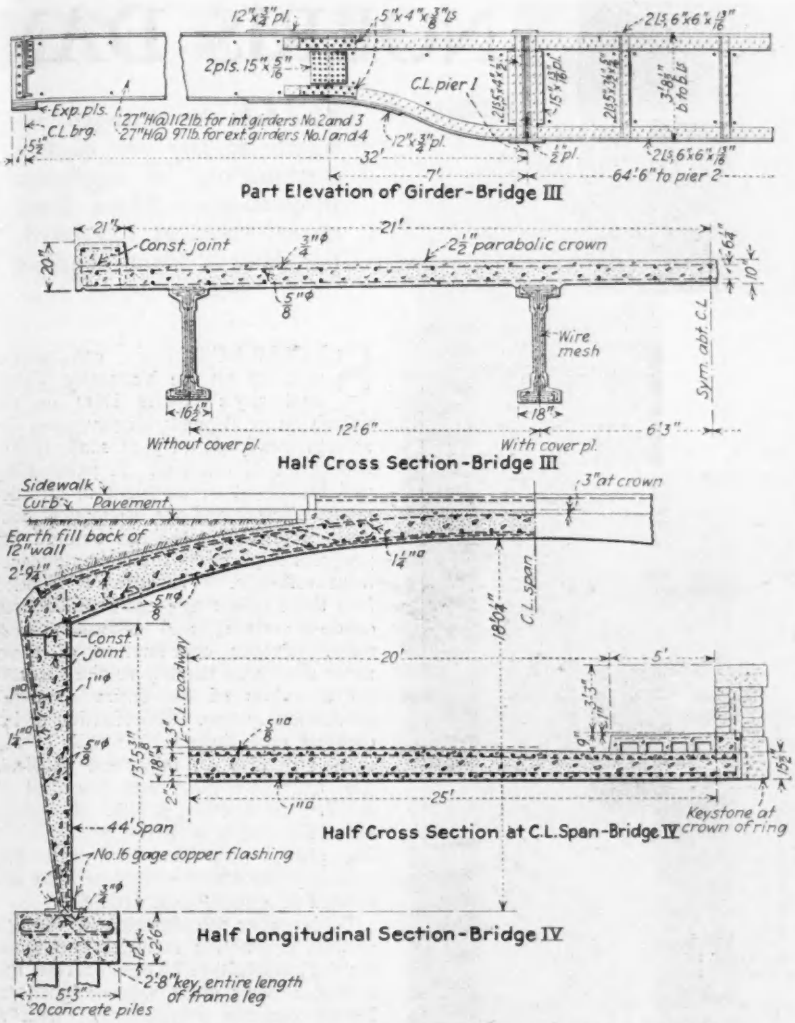


FIG. 7—TWO TYPES of grade-separation structures on St. Louis belt highway, a three-span continuous steel girder and a concrete rigid frame.

The variation in the layouts is also carried to the grade-separation structures themselves. Thus three-span concrete girder bridges with open abutments are used at Route 99 and at Natural Bridge Road. At U. S. 40 and U. S. 61 a three-span continuous steel girder is used, and at U. S. 66 the separation is effected by a stone-faced concrete rigid frame. All of the bridges provide clear roadway spans free of columns.

The two concrete girder bridges that carry the belt highway are similar except that the Natural Bridge Road crossing is made at a 22-deg. skew. Both bridges have central spans of about 47 ft. and side spans of 32½ ft. Foundations of both bridges are supported on creosoted timber piles 30 to 35 ft. long.

The rigid-frame concrete bridge at U. S. 66 is of the barrel type, with a clear span of 44 ft. for the belt highway. The arch barrel is 52½ ft. wide, providing a 40-ft. roadway for U. S. 66 and a 5-ft. sidewalk at either side. With its approach wingwalls, the total length of this bridge is 146 ft. The bridge and wingwalls are faced with St. Louis County limestone and trimmed with Missouri red granite along the top of the hand-rail and at the pilasters. Both the frame and wingwall footings are carried on precast concrete piles driven to sustain a load of 25 tons each. Details of the rigid frame are given in Fig. 7.

An unusual steel structure

The belt highway is carried over U. S. 40 and U. S. 61 on a three-span continuous steel bridge of somewhat unusual character. The bridge is on a slight skew, and four lines of girders are used. The main span is 64½ ft., and side spans are 32 ft. c. to c. of bearings. Abutments are of the open type, and they and the piers are carried on concrete piles 25 ft. long. In the main span a 44½-in. plate girder is used, extending over the piers 7 ft. into each side span, where it is reduced in depth to 27 in. and spliced to a rolled section beam as shown in Fig. 2. The girders are on fixed shoes at one pier and on rockers at the other three supports. Sway frames are used between the girders on about 20-ft. spacing. The roadway is a 10-in. concrete slab. The bridge was designed for an H-20 loading on two lanes.

Other structures upon the route do not depart to any extent from the usual design practice, with the exception of the one located in Huntleigh Village, over Two-Mile Creek (Fig. 2). Due to the fact that this area contains a number of country estates on which landscaping and architectural features are prominent, special attention was given to this structure to obtain an appearance in harmony with its surroundings.

The structure consists of a 60-ft., clear-span, reinforced, spandrel-filled, concrete arch with curved wingwalls. The bridge and wingwalls are faced with St. Louis County limestone. A 42-ft. roadway is provided. All foundations are upon solid rock.

The work on the belt highway has been done by the Missouri state highway department under the direction of T. H. Cutler, chief engineer.

Long Rail Bridge Completed Over Zambesi River in Africa

The last span of the Lower Zambesi Bridge, the chief feature of a $7,171,885 project that is being carried out on behalf of the Central Africa and Trans-Zambesia Railway Co. by the Cleveland Bridge & Engineering Co., was erected in October. This bridge, apart from its influence on the transport problem of East Africa, is a project of outstanding importance, for, with a total length of 11,630 ft., it is believed to be the longest railroad crossing of a waterway in the world. The Tay Bridge in Scotland is 10,527 ft. long, and the Hell Gate Bridge in New York, is 13,553 ft. long, but more than 10,000 ft. of the latter is over land. The Lower Zambesi Bridge, on the other hand, spans a river which, in the winter season, is as wide as the bridge is long.

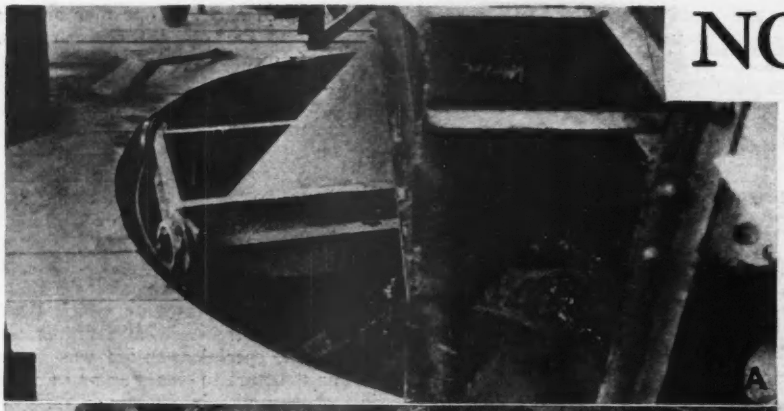
The concession granted by the Portuguese government to the British Central Africa Co. provides for the building and working of a bridge and railroad connections with the Central Africa Railroad system to the north and with the Trans-Zambesia Railroad system to the south. The concession lasts for 99 years, after which the bridge reverts to the Portuguese government.

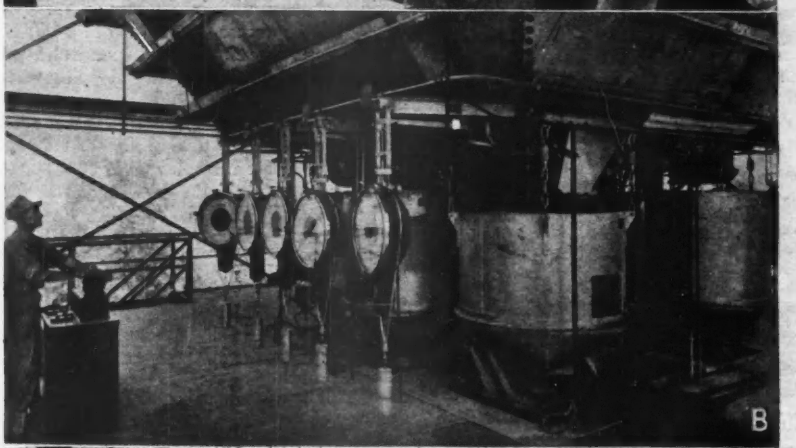
The bridge consists of 2,589 ft. of viaduct, 33 main-truss spans of 262½ ft. and six approach spans, the aggregate total over-all length being 11,650 ft. 9 in.

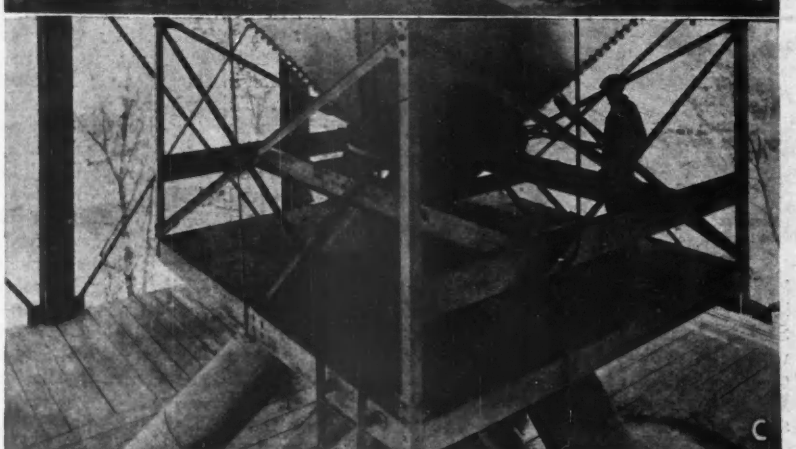
The south approach line to the bridge, from Murraca, the present terminus, to Sena, the bridge head, is now complete, with all its bridges. Steady progress is also being made with the realignment of some 10 miles of line between Murraca and Beira.

NORRIS DAM

Mix can be changed instantly to any one of five combinations of aggregate proportions — Three 3-yd. mixers rated at 180 cu.yd. per hour — Plant requires small crew







SATISFACTORY construction progress on the Tennessee Valley Authority's Norris Dam on the Clinch River depends largely upon the smooth steady delivery of some 1,000,000 cu.yd. of concrete. A painstaking and intelligent development of an adequate, efficient and yet economical concrete-production plant has assured the progress required by the concrete-placement schedule. The plant is divided into three units: aggregate production, concrete mixing and concrete placement. Proper coordination of these three units was the key to the successful operation of the entire concrete-production system. Coordination of individual operations within each of the units was also an important problem. The aggregate plant was described in *ENR*, Sept. 6, 1934, p. 301. The present article deals with the central mixing plant, while the third unit, the cableway placement system, will be described in a subsequent article.

With proper consideration for the aggregate production facilities and those for final disposition of the concrete, the central mixing plant was designed to insure accurate proportioning with a variety of mixes, thorough mixing and complete synchronizing of the various operations involved, all rapidly and economically. Features of the plant are simplicity of operation, power-operated proportioning units, and a system whereby the proportion can be changed instantly for a variety of mixes without interruption of flow of material through the plant. With three 3-yd. mixers, the rated capacity of the plant is 180 cu.yd. per hour, though operating experience in producing the first 75,000 cu.yd. indicates that an output probably 20 per cent in excess of that capacity may readily be maintained.

The operating efficiency of the plant is indicated by the size crew required —only six in addition to a foreman

VARIOUS UNITS OF THE CONCRETE

A—Turnhead at top of plant for discharge of incoming materials to desired storage bin. B—One of the two batteries of batchers, showing scale dials with adjustable light indicators. A battery of three batchers is on the opposite side of the bin. C—After the dry materials are batched they are dumped into one of the three mixers through this power-operated turnhead, self-spotting over the charging spouts. D—Three 3-yd. tilting mixers are rated at 60 cu.yd. per hour each.

Photos by Neukom

CONCRETE PLANT

and inspector. The regular operating crew consists of one dispatcher, one headhouse operator, two batcher operators, one mixer man and one mechanic. This small crew is all that is required for the production of 180 cu.yd. of accurately proportioned concrete per hour. The plant is contained in a five-story steel tower fabricated with rivet bolts to facilitate dismantling. Principal operations are conducted at three levels: the headhouse and storage bins at top, batching bins in the center and the mixers below.

Various sizes of materials

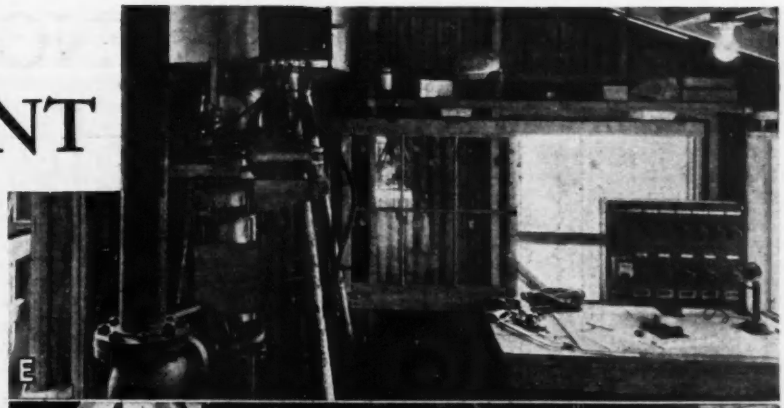
Aggregates, all of crushed stone, are produced from the deposit of dolomitic limestone at the site, including manufactured sand. Materials are screened into six sizes for proportioning of various mixes: fine sand passing a No. 8 screen and retained on a 100-mesh screen; coarse sand retained on the No. 8 screen and passing a ¼-in. mesh; and four sizes of crushed rock, ¼ to ¾ in., ¾ to 1½ in., 1½ to 3 in. and 3 to 6 in. The latter, called cobbles, may run in slivers 12 to 18 in. long.

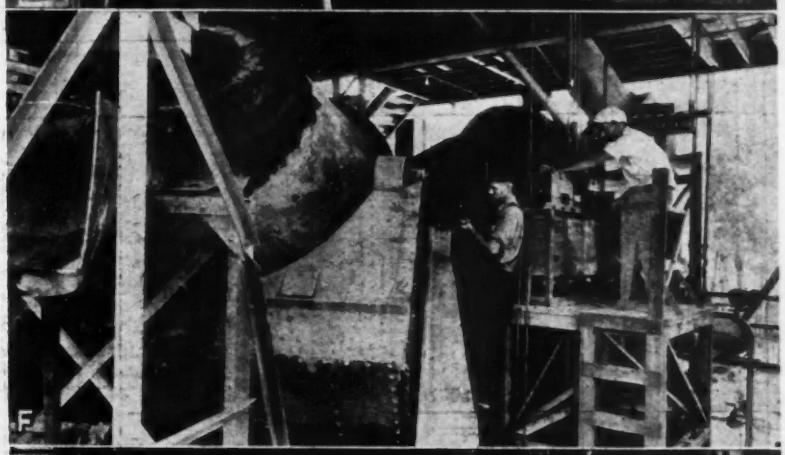
Proportions of these aggregates vary in the mix with corresponding varying requirements at the dam. The plant is so designed that five combinations of proportions are instantly available. Additional combinations can be made by slight adjustment of the batching equipment.

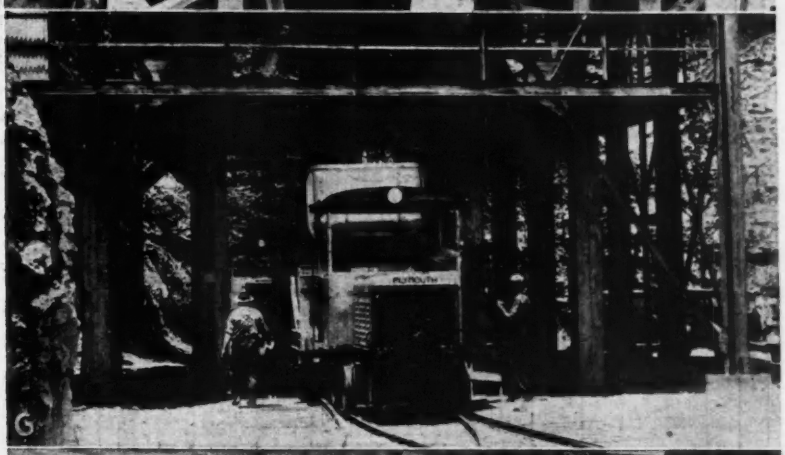
Route of materials

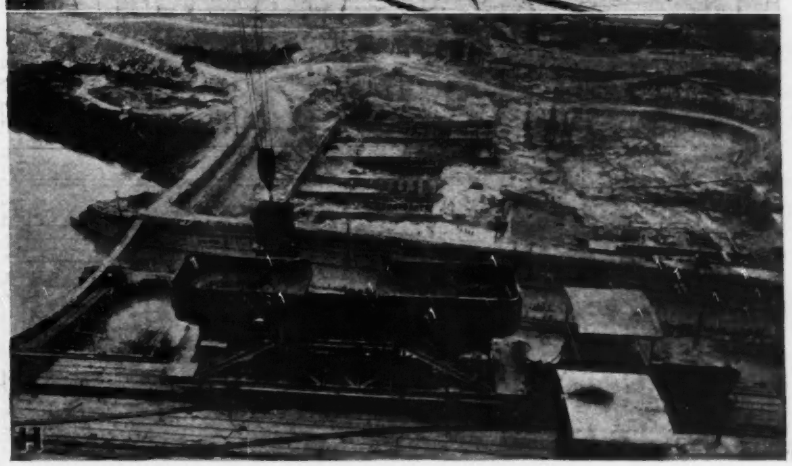
Crushed stone and sand are delivered from the aggregate storage to the top of the headhouse by a single-belt conveyor discharging into a hopper. From this hopper each size of material is discharged through a turnhead spout into separate storage bins ranging in size from 140- to 210-cu.yd. capacity. At the aggregate-bin level are two 470-bbl. bulk-cement bins, receiving cement by a pump line from a silo storage. Cement is transferred from boxcars at a railroad siding 5 miles away to the silo by tank dump-trucks.

From the various storage bins the materials are dumped into individual





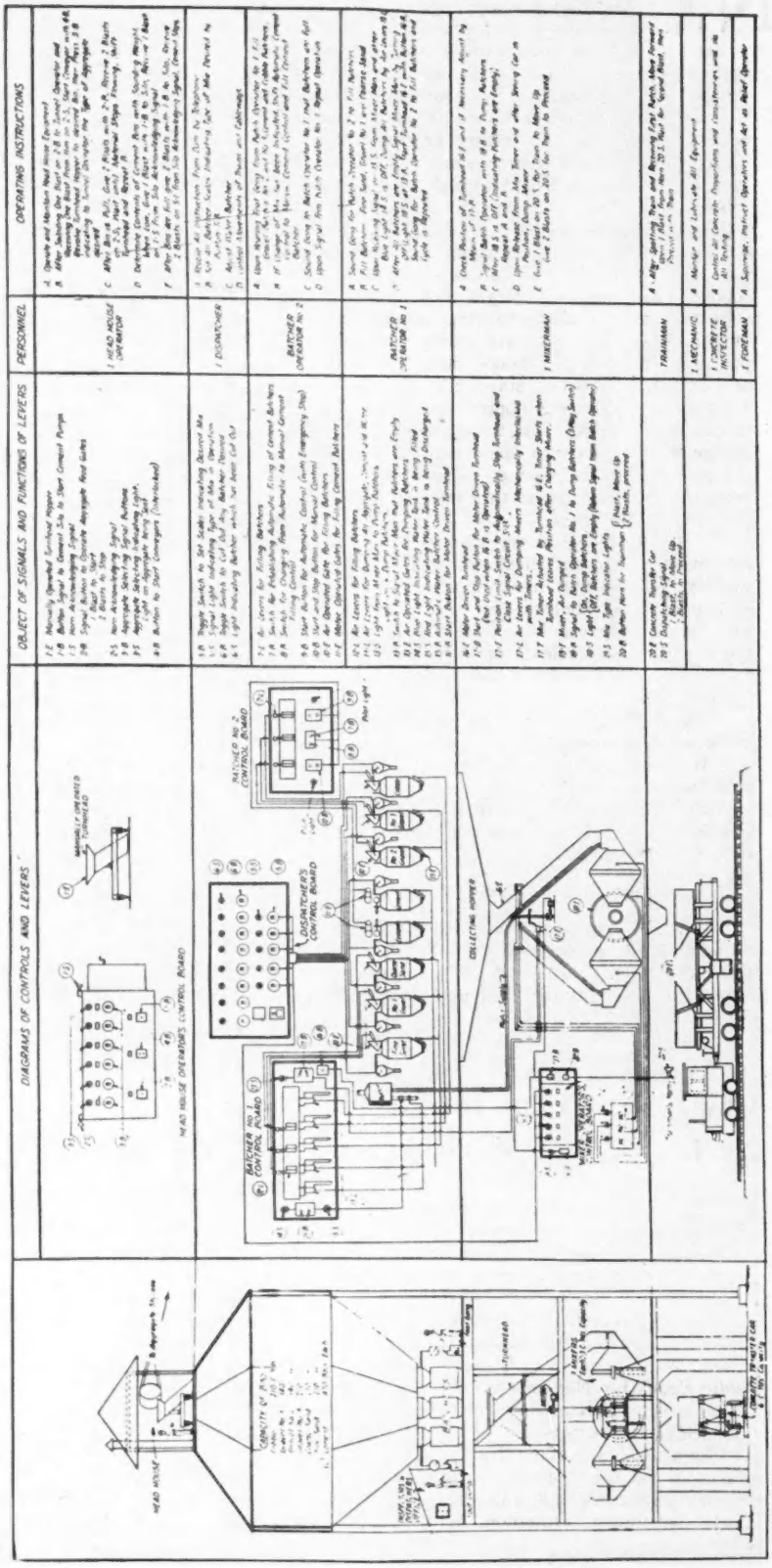




PRODUCTION PLANT AT NORRIS DAM

E—From the control panel at the right the dispatcher can call for any one of five mixes. The volumetric water batcher is at the left. F—One operator handles the three mixers. Directly over the operator's head is one of the charging spouts, with the water inlet pipe directly below it. G—Loading of the twin-skip cars with mixed concrete, ready for transportation to the dam. H—Cableway buckets are charged from the central hopper on the car, into which the two skips dump together.

weighing batchers arranged in two batteries, one of three batchers and the other of five. Although there are two cement bins and corresponding batchers, only one set is used at a time, the other being a stand-by unit. Alongside the aggregate batchers is a volumetric water batcher. All the aggregate and cement batchers discharge into a common collecting hopper. From this hopper the materials are conducted through a power-operated turnhead discharging into one of three spouts leading to the three mixers. Water is discharged through separate pipes on the turnhead and alongside the spouts. The three mixers, electrically driven tilters, are set radially to discharge into a common hopper from which concrete is fed to skips on railroad cars spotted under the mixing plant.



DIAGRAMMATIC SKETCHES of the mixing plant and procedure of operation, as contained in the operating instructions to the crew.

Details of equipment

Each batcher for cement and aggregates, suspended independently from the bottom of the storage bins, has its own weighing scale of the springless dial type. Around the rim of each scale dial are five adjustable indicators, each equipped with a small light. When the proportions of a certain mix have been established, one indicator is set on each scale for the weight of the material required for that mix. The indicator lights of each scale corresponding to the mix are wired to a single switch. This setting of indicators and wiring in groups is repeated for five combinations, wired to five separate switches. Throwing of any one of the five switches by the dispatcher turns on the light of one indicator on each scale, and the batcher men simply fill the batchers until the scale pointers reach the lighted indicator.

Gates for both filling and dumping the aggregate batchers are operated by air rams, manually controlled. Those for filling can discharge 20 tons a minute into the batchers; the dump gates can empty the batchers in 7 sec. Each cement batcher is equipped with a rotary-type filling gate, operated by an enclosed electric motor. When the batcher is filled to the required amount, cutoff of the feeder is automatic through a quick-acting magnetic brake on the feed motor. Discharge of the cement batchers is manually controlled through an air-operated gate faced with rubber and covered with a dust hood. Filling and discharge gates are interlocked to prevent filling while dumping. A manual slide gate permits auxiliary filling of the cement batcher.

Water is proportioned in a volumetric batcher (200-gal. capacity) equipped with an automatic air-driven cutoff valve. The amount of water is regulated by a motor-driven screw riser within the tank. Discharge is controlled by a quick-opening air valve manually operated. Intake and discharge are interlocked.

Each of the three 3-yd. tilting mixers is independently driven by a 40-hp. motor through a multiple-rope drive. The mixers are of standard design except

for the addition of a wear-resisting coating to the interior. Discharge of the mixers is independently controlled through air-operated rams, interlocked with a timing device that prevents dumping prior to a designated elapsed time. To eliminate vibration in the plant structure and resulting disturbance of the delicate weighing apparatus, the mixers are carried on concrete piers independent of the plant framework.

Operation of the plant

The accompanying diagram shows the operating procedure. Operation of the plant can best be described by outlining the duties of the operating personnel:

Headhouse operator—The sole duty of the headhouse operator is to keep the storage bins at the top of the plant filled. He works from a control panel, by which he can signal the cement silo and the aggregate storage. Control of the cement bins is by simple signaling of the cement pump operator at the silo when to start and stop the pumps. All aggregates are delivered to the headhouse by a single conveyor leading from a collecting tunnel under the various aggregate storage piles. By signal control the headhouse operator can call for any one of the six sizes of aggregates that he desires. He sets the turnhead at the intake hopper to discharge into the desired bin. The motor driving the charging belt is under the control of the headhouse operator.

Dispatcher—The dispatcher receives all orders from the dam by telephone. Through a control panel he can call for any one of the five combinations of proportions for the mix desired. This panel is equipped with lights to indicate the mix being used. The dispatcher can cut out any batcher at will, and a signal light on the control panel indicates the batcher so cut out. Changes in water proportions are made by the dispatcher. He also has supervision over movements of trains and cableways.

Batcher Operator No. 2—Upon receiving a gong signal from batcher operator No. 1, operator No. 2 fills the No. 2 gravel, No. 3 gravel and cobble batchers in succession by manipulation of air-gate control levers, shutting off each gate as the scale-dial pointer reaches the lighted indicator. He also starts filling one of the two cement batchers by pushing a control button. If a change of mix has been ordered that involves a different amount of cement, it is necessary to change the automatic cutoff of the cement feeder to manual control of the slide gate until the automatic feature can be adjusted to the new mix. When the four batchers are filled, the operator signals operator No. 1 by a gong.

Batcher Operator No. 1—Batcher operator No. 1 is in control of the batching equipment. He signals operator No. 2 to start filling the batchers in that battery, as indicated above. He then pushes a button to open the water-tank filling valve, which closes automatically when the required amount is in the tank. By manipulation of levers controlling the filling gates, operator No. 1 fills the two sand and gravel No. 1 batchers. Upon receipt of a signal from the mixer man this operator dumps all the batchers by manipulation of five air-control levers in succession as follows: (1) water; (2) cement; (3) fine and coarse sand; (4) No. 1, No. 2 and No. 3 gravel; (5) cobbles.

The proper sequence of dumping the batchers is essential to rapid charging of the mixer. Vibration of the cobbles, dumped last, clears out the collecting hopper and charging spout. When all the batchers are empty the operator signals the mixer man and pushes a button which starts the turnhead on the collecting hoppers moving to the next mixer. The timing device on the mixer goes into operation when the turnhead starts moving. The turnhead automatically comes to a stop over the next mixer spout.

Mixer Man—The mixer man checks the location of the turnhead, and if slightly off position he can adjust it with pushbutton control. He then signals batch operator No. 1 to charge the mixer. Upon release of the timing device and after making sure a car is spotted under the hopper, the mixer man discharges the mixer by manipulation of an air-control lever. He signals the train operator by horn to respot his train and move out.

With a 2-min. mix for all concrete, it is possible to maintain a 3-min. schedule for each of the mixers.

Transfer of concrete

Concrete is transferred from the mixer plant to the cableway by three standard-gage trains consisting of a gas-electric locomotive and a double skip car. The skips, holding the contents of one mixer each, dump into a hopper at the center of the car. This hopper opens on one side between the car wheels, just above rail level, discharging directly into cableway buckets set on a shelf alongside and below track level. The skips, set on rocker arms, are dumped by individual electric motors controlled by the locomotive operator. The train operates on a double track from the mixing plant to beyond the extreme range of travel of the cableway head towers. This track is arranged with suitable cross-overs, permitting flexible operation of the three trains.

Progress and personnel

Present indications are that the original schedule for the construction of Norris Dam, providing for initial storage of water early in 1936, will easily be maintained and the project completed on time. Quarrying operations are proving very satisfactory, with the character of rock improving as depth is reached. In manufacturing sand it has been possible to obtain very close adherence to rather rigid specifications. Increased sand-making capacity is being installed, to permit more rapid operation than was possible with the original units.

The mixing plant and such special equipment as batchers and operating system, cars and buckets, were designed by the Tennessee Valley Authority. A. E. Morgan is chairman and chief engineer of the Tennessee Valley Authority, C. A. Bock is assistant chief engineer, C. H. Locher is construction consultant, and A. J. Ackerman is construction plant engineer. The Norris Dam is being built by the day-labor system under the direction of Barton M. Jones, construction engineer. Ross White is superintendent of construction, and F. C. Schlemmer and E. M. Whipple are assistant superintendents.

Quality of Concrete as Affected by Length of Mixing Time

STUDIES conducted by the Bureau of Public Roads at two central mixing plants, to determine the effect of the length of the mixing time on the uniformity of distribution of the ingredients and on the strength of the concrete as mixed in large-capacity mixers, are reported by William A. Blanchette in *Public Roads* for November, 1934. The following conclusions are listed for guidance to contractors:

1. Standard revolving-drum batch mixers do not mix concrete so that the cement, aggregates and water are uniformly distributed throughout all parts of the batch.

2. The degree of uniformity of distribution of the ingredients is not materially changed by changes in the mixing time from 1 to 4 min.

3. The length of the mixing time between 1 and 4 min. appears to have little effect on the strength of concrete as mixed in standard revolving-drum batch mixers.

4. Standard revolving-drum batch mixers act as a ball mill in reducing the size of particles of the fine aggregate.

5. The amount of grinding of fine aggregate so that it passes the No. 100 sieve increases with the length of the mixing time.

Denver Secures PWA Loan for Water Diversion

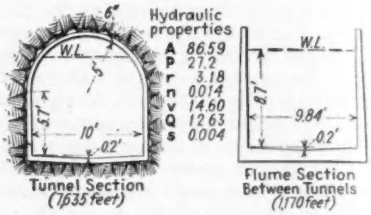
Water from Fraser River to be diverted through Continental Divide to South Platte River by way of existing pioneer bore of Moffat Tunnel, providing irrigation supply for lower valley in exchange for water taken by city from upper river

AFTER a year's negotiations with the PWA, the Denver Board of Water Commissioners on Nov. 9 consummated a lease agreement whereby $3,500,000 is to be expended on the transmountain diversion of 54,600 acre-ft. of water annually from the headwaters of the Colorado River through the pioneer bore of the Moffat railroad tunnel. As the lease method of financing has been used on only one other PWA project (a prison in Atlanta, Ga.), there were many legal as well as financial obstacles to be overcome, requiring numerous conferences and attempts at writing a contract that would be mutually satisfactory.

As finally worked out, the city has deeded all the property and rights concerned in the diversion project to PWA, which in turn will lease the property back to the city for a term of 30 years, at a rental charge of $175,000 per year, an amount sufficient to cover 4 per cent interest and amortization of the rent certificates that were issued by the city to pay for 70 per cent of the loan-and-grant money expended for the proposed improvements. The redemption money will come out of water revenue. The certificates are not secured by the faith and credit of the city. When the certificates have been amortized, the government will reconvey the property to the city, but an assignment provision will permit the government to turn the lease over to a third party. Rates are sufficient to cover all bonded indebtedness, operation and maintenance costs, as well as the rent certificates without preference or priority. Thus this "rent" is legally considered an expense of operation, but in effect the financing is quite similar to water revenue bonds or certificates of other cities. Denver voted 2 to 1 in January in favor of the lease method. Engineering and construction are to be done by the city but must be satisfactory to the PWA administrator, and will be under such engineering supervision and inspection as he may require. Prior approval is required before any construction starts.

Water to be obtained by this project is to be secured by means of collecting ditches, tunnels and pipe lines, 8.8 miles in total length, from the watersheds of Big Vasquez Creek, Little Vasquez Creek, Fraser River and Jim Creek, and conveyed by the Moffat Tunnel pioneer bore eastward through the Continental Divide. Issuing from the eastern portal of the tunnel, the water will flow in the channel of South Boulder Creek to a diverting dam 3 miles above Eldorado Springs. Thence the water will be carried 6 miles by tunnels, siphons and canals to natural drainage courses leading to Zang's Reservoir or Standley Lake.

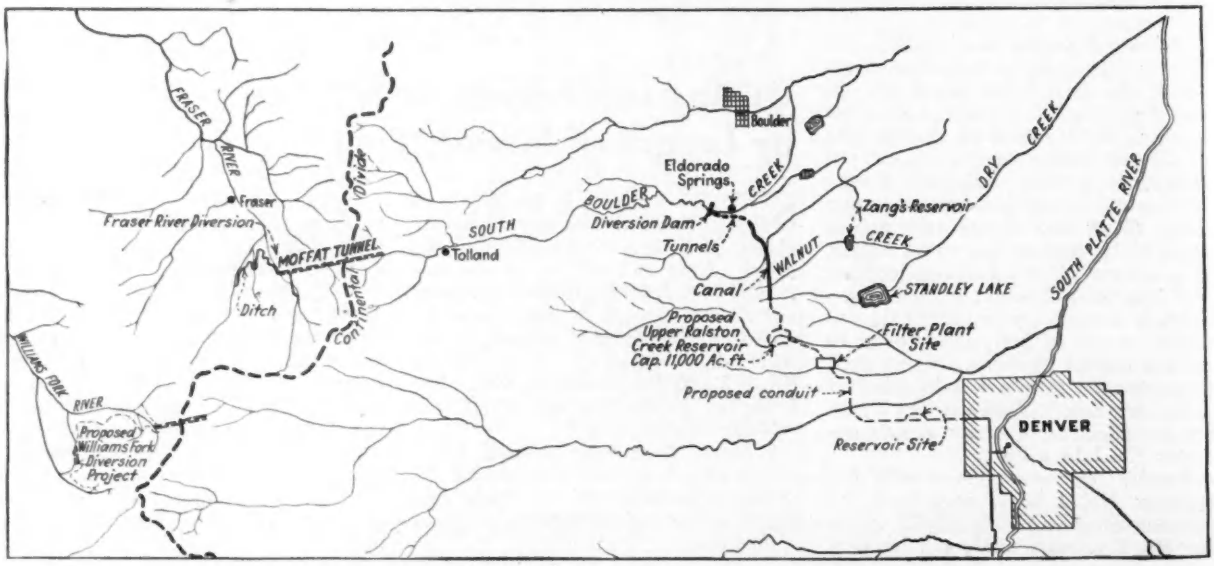
The water will be sold or exchanged for water in the South Platte River above Denver. The diverted water may be discharged into the South Platte River just upstream from Fort Lupton and serve several irrigation districts that have rights to water in the river above Denver, water that could be used by the city direct or stored in its reservoirs.

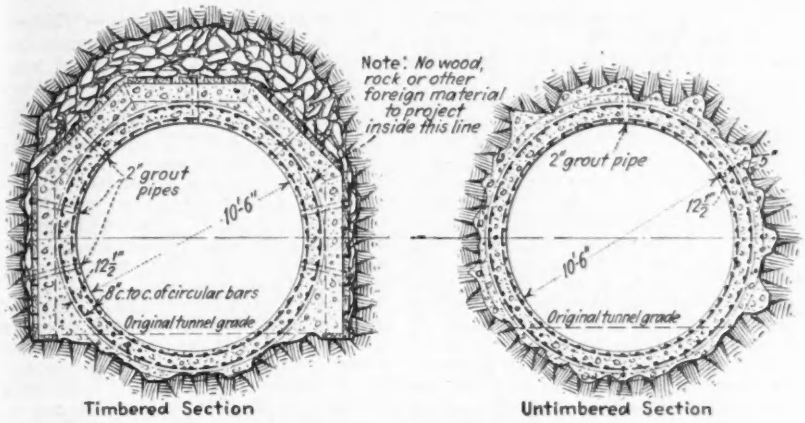


TUNNELS AND FLUMES on eastern slope leading to Dry Creek, a tributary of the South Platte River.

Originally it was intended to ask the PWA for $8,000,000, but the time factor of completion was too great to permit construction of the full program within PWA limitations of two years. With this large sum it was planned to bring the water from Fraser River, which is soft and highly desirable as a domestic supply, into Denver by an extension of the canal and a siphon line to a proposed 11,000-acre-ft. reservoir on Ralston Creek. Below the reservoir a filter plant would be built and from it a pipe line to carry the water to the existing Ashland Ave. Reservoir.

MOFFAT TUNNEL transmountain diversion project. Canals and conduits collect water on western slope and discharge into pioneer bore of Moffat Tunnel. At eastern portal the water is to be carried down South Boulder Creek to a diversion dam, thence by canal to the headwaters of streams that feed reservoirs from which flow can be discharged into the South Platte River.





MOFFAT TUNNEL LINING in two types of rock. New timbering where required will consist of 10x10-in. sets, 4 to 5 ft. c. to c., and 3-in. lagging, but the major part of the work will not require timbering.

Already $1,100,000 has been spent on the project, mainly in enlarging, lining, timbering and maintaining the Moffat pioneer bore. Ultimate consummation of the project would have been made on a slow pay-as-you-go program, but the PWA loan-and-grant method will speed up the work and give much-needed employment, estimated at 967,000 man-hours, over a period of eighteen months for the eastern slope works; at 1,172,500 man-hours for eighteen months for the Moffat Tunnel work; and at 448,900 man-hours over a period of twelve to eighteen months for the western slope diversion conduits.

It is hoped that a contract can be let in December for the Moffat Tunnel work, which can proceed in winter, and that this can be followed in the spring by a number of smaller contracts for the outside work.

Need for the water is great, since Denver has nearly reached the limit of its water-supply capacity, and has frequently had to restrict the use for irrigation of lawns and trees. Since Nov. 1 this year all irrigation has been prohibited. Water is now purchased from ranchers, but condemnation of this supply for permanent use would automatically ruin ranches and lessen the extent of the surrounding agricultural development that has been laboriously built up for 70 years.

The Moffat Tunnel project is one of a number in a comprehensive plan of development and enlargement, prepared and adopted several years ago. Major projects in that plan already completed include Marston Lake, Lake Cheesman, Antero Reservoir and Eleven-Mile Canon Reservoir. Uncompleted are the Moffat Tunnel project, the Blue River diversion, the Two Forks Reservoir and Williams Fork diversion.

Construction Code in Present Form Unsatisfactory to Contractors

Survey of contractors brings out prevailing opinion that code is not accomplishing its purpose, is detrimental to the contracting business and is inefficiently administered—Financial aspects of code operation shown in detail

THE CODE of Fair Competition for the Construction Industry (Chapters I and II, governing general contractors) has been in effect for more than eight months. This is too short a period in which to judge the code's effectiveness, but it has been long enough for those who must operate under it to form opinions on some important questions. Their answers should be of value in developing the code into a workable document.

Is the code accomplishing its intent and purpose of placing construction on a fair competitive basis? Is it helping construction labor? Is the code a benefit or a detriment to the business of contracting? Is it being efficiently administered without creating a burden on contracting? Should the code be continued in present or amended form beyond its contemplated expiration next June, or should it be discarded? These are the questions that were asked of general contractors by *Engineering News-Record* recently. Letters were sent to large and small contractors in every state, to those of the building, heavy construction and highway classifications, to secure a true cross-section of opinion. Under the pledge of confidential handling of replies, frank and outspoken answers were received, many informants going far beyond mere answering of the questions asked.

Sentiment against the code

The sentiment expressed by general contractors all over the country is overwhelmingly against the code under present conditions of operations. Opinions are to the effect that (1) the code is not accomplishing its purpose, (2) labor is not being benefited, (3) operations are a detriment to the contracting business, (4) administration is inefficient, and (5) the code should be discarded or amended. The majority of the votes favored the latter.

Numerical results of the survey, expressed in percentages of replies received, are as follows:

1. Do you believe the construction code is accomplishing its intent and purpose of placing the contracting industry on a basis of fair competition? No, 67 per cent; yes, 15 per cent; doubtful, 18 per cent.

2. Is the code beneficial to construction labor:

   A. By improving its earning power? No, 63 per cent; yes, 37 per cent.
   B. By providing steadier work? No, 69 per cent; yes, 31 per cent.
   C. By reducing the occasions for disputes over jurisdiction or working conditions? No, 75 per cent; yes, 25 per cent.

3. Do you consider the code a benefit or detriment to your business as a contractor? Benefit, 27 per cent; detriment, 73 per cent.

4. Do you believe the code is being efficiently administered? No, 62 per cent; yes, 38 per cent.

5. Is its administration simple and trouble-free, or do you find it places a serious extra burden on you? Trouble-free, 30 per cent; burden, 70 per cent.

6. Should the code be:

   A. Continued in its present form? Yes, 25 per cent.
   B. Discarded entirely? Yes, 19 per cent.
   C. Amended? Yes, 56 per cent.

Reasons for dissatisfaction

Reasons for dissatisfaction, as given with the answers to the questions, may be summed up as follows:

The code is failing to accomplish its purpose because: (1) it is too involved and cumbersome to enforce; (2) cooperation from the government in

prosecuting violators is not forthcoming; (3) administration without enforcement is difficult and inefficient; (4) the code is fostering the day-labor system.

Construction labor has not been benefited, except in a few instances, because total earning power has not been improved, even though wage rates have been increased. Occasions for disputes have increased, resulting in disruption of labor relations.

The code is a distinct detriment to contracting as a business, because the exempting of public agencies operating on a day-labor basis has seriously curtailed the already scant opportunities for work.

Administration is inefficient, due mostly to lack of funds by state and local administrative agencies. It is generally admitted that administrators are doing everything possible to administer the code effectively and efficiently, but they are virtually helpless without funds and without enforcement powers or enforcement cooperation from NRA.

Under such conditions administration is far from simple and trouble-free. It is proving a burden to contractors and is creating a growing resentment against the code.

The preceding statements express the consensus of the contractors' opinions.

As noted in the above compilation, 19 per cent of the replies advocated complete discarding of the code, while more than half recommended amendment of some sort but continuance of the code, to retain its desirable features. Principal recommendations for amendment include: (1) require public agencies to comply on day-labor work; (2) retain only the hour and wage features; (3) put teeth in the code, with full enforcement powers; (4) reduce the complex multiple-chapter code as it now exists to one simple code for the entire industry, dealing solely with labor relations and general business ethics and fair practics, excluding detail business practices.

Comments and suggestions

Many interesting comments on present operations and suggestions for changes were received, not all unfavorable to the code. Some of these are presented at random.

Building Contractor, New England—"I believe that Chapters I and II are first rate as they are written. They concern themselves with decent ethics, minimum wages and maximum hours. Some of the other chapters go beyond these points, and weaken themselves in so doing."

General Contractor, Ohio—"I believe the code is very beneficial, and we are for it 100 per cent if it can be properly administered and policed. I do not believe this can be accomplished because of the cost involved for the support of an administration required."

General Contractor, New York State—"Contractors regulated locally their various difficulties when not hampered by national administrations that favored the American Federation of Labor."

Building Contractor, Kansas—"The code is certainly not accomplishing its purpose. The small operators are not complying or intending to comply. Others who are endeavoring to comply are bewildered by the dual codes and preyed upon in the price fixing by material vendors and manufacturers to the extent that all building operations other than government work are being retarded. Private buyers will not accept the increases in costs brought about by the codes. The code is proving a detriment, because of government invasion of contracting without code observance. The code should be amended to provide one simple code, and an effective organization of construction men and not politicians given the responsibility of making it effective. The wage and hour provisions should be retained, applicable to every individual picking up a construction tool and offering his services for any construction or repair work, large or small. The whole code is a chimerical structure. Compliance and recognition have been remote rather than general."

Building Contractor, South Carolina—"The code has not helped the general contractor, because in this section he is now under labor union control from Washington, code material prices are artificially high in many respects, and the contractor who wants to live up to the spirit of all codes cannot obtain materials as cheaply as one who is willing to use bootleg materials. Better contractors here have not been able to compete with the cats and dogs who are permitted to bid on government-financed work, and the increase in wage rates and materials prices prevents private investors from building. Those in charge of code administration are good men and are probably doing their best, but the government cannot prevent bootlegging of materials when buyer and seller are both against the codes, any more than it could stop bootlegging of whiskey. It is admitted practice here to pay less than the invoiced price of materials."

General Contractor, New York State—"The code should be amended to provide adequate funds to compel compliance, by providing federal authority to compel PWA, industrial commissioners and fiscal officers to carry out the spirit and intention of the code. Our experience has shown that the state industrial commissioner, city comptroller and state officials, despite the Schackno Act, refuse to recognize that the codes divide the construction industry into three distinct branches. They insist on certifying the highest rates (building trades) for heavy construction and highway work, causing costly labor disturbances and increasing the cost of work."

Highway Contractor, Connecticut—"The code has accomplished nothing for the highway contractor except the beneficial factor of establishing a minimum wage."

General Contractor, New York State—"The code has failed in accomplishment because of lack of enforcement, the attempt to include too many minor details which are unpopular and unenforceable and too great an attempt to correct at one stroke of the pen conditions built up and existing over a long period. The multiplicity of authorities and the expense of administration are burdensome—in the aggregate too great a burden for construction to bear—and add to the already high cost that is retarding new construction."

General Contractor, Georgia.—"The code is a benefit because all contractors are required to conform to a uniform wage scale and uniform working hours. For two years prior to the code and establishment of road-work wages by the Bureau of Public Roads, we refrained from bidding on work because we did not care to ask labor to work for the low scales necessary to pay to get down to competitive prices."

General Contractor, Kansas—"Have had much difficulty with interference of other codes, such as trucking, masons, sand, gravel and slag producers."

General Contractor, Illinois—"NRA, instead of permitting this industry to create a code as provided for by law, is continuously injecting itself into the picture and prescribing rules and regulations of its own that are not feasible or workable, and as a result have a tendency to defeat the purpose of the act. Union labor has benefited at the expense of unorganized labor. Many of our clients not subject to the code are now doing their own work. Administration is difficult because so few contractors take the code seriously or are familiar with its requirements. Too many agencies are exempt from its operations, favoring day-labor operations."

General Contractor, Minnesota—"To be of any value, the code must be short, simple, and enforcement must be swift and complete—otherwise it is a sheer waste of time and energy."

General Contractor, Tennessee—Suggested amendments: "The famous paragraph 7a, Art. III, should be amended so that the employees of contractors may be properly defined. The right given public bodies to set up wages scales and working conditions for individual projects should be eliminated. More authority should be given state code agencies. Divisional code authorities should be abolished, leaving state agencies to deal with one central agency in Washington. Public bodies should be made to comply with provisions regarding rejection and readvertising of bids."

Building Contractor, New York State—"There are no adequate means of checking up to find out if contractors are living up to the code. Complaints of violations seem to stop with the enforcement department of NRA. We now have an honor system of code, with contractors having a sense of fair play living up to the code—the type of contractor that doesn't need a code. He is handicapped by competing with those refusing to comply."

General Contractor, Missouri—"Cutthroat competition seems to be as rampant as ever. The day-labor system is becoming a serious threat to contracting. The government should keep out of business that belongs to private citizens."

General Contractor, Iowa—"Code compliance is apparently going to be a matter of education and willingness to comply within the industry, rather than dependence upon the government for compulsory compliance."

General Contractor, Colorado—"The success of the code depends upon the industry itself. There are too many in the business, and it is too easy to get into it. Lack of cooperation on the part of public agencies has been the greatest weakness in the operation of the code.

Financial situation

Lack of funds for effective and efficient administration figures heavily in

the above discussions. In checking receipts of registration fees, we find that in the first seven months of code operation, ending Nov. 1, receipts were only 28.4 per cent of those anticipated by the code budget. The General Contractors Divisional Code Authority has had only 25.7 per cent of anticipated funds on which to operate, and only 23.3 per cent of the amount contemplated by the budget has been returned to state and local agencies.

Well Points Supply Sea Water for Swimming Pool

Intake arrangements at new officers' club pool at Fort Monroe provide naturally filtered supply of salt water free of sediment—High-silica cement used for first time in East

By H. W. Cochran
Captain, 51st Coast Artillery; Adjutant
Fort Monroe, Va.

A NEW open-air concrete swimming pool that embodies several interesting features has been recently constructed at Fort Monroe, Va., for the use of officers of the army post and their families. High-silica cement was adopted for the construction of the pool as the first use of this product in the East, though it has been used on the West Coast for four years. Another novel feature of the pool is the intake arrangement by which sea water is collected from a series of well points after being filtered through the sand of the beach. The pool was made desirable by the poor swimming facilities at the fort. Waters along the shores of Hampton Roads carry so much fine sand and sediment stirred up by tidal action that swimming is disagreeable. Furthermore, during the summer months the small jelly fish, known locally as nettles, make ocean bathing in this vicinity almost impossible.

The pool is divided into two sections, 60x90 ft. and 15x60 ft., the latter for use of children. The bottom of the main pool is spoon-shaped, 3 ft. deep at one end, 6½ ft. at the other, with a maximum depth of 9½ ft. In the children's section the depth varies from 8 in. to 3 ft. All walls are 1 ft. thick, carried on spread footings. A 6-in. slab comprises the small pool floor; that of the larger section is 8 in. thick. For night swimming the pool is lighted by six 2-kw. overhead floodlights and 21 400-w. lights inserted in the walls 30 in. below water surface.

Well-point supply

The method of obtaining salt water for the pool is unique. Nineteen 1¼-in. well points were jetted 20 ft. into the beach in front of the new seawall being built along the shore (*ENR*, Aug. 9, 1934, p. 163). These are connected to a header pipe leading to a 4-in. double-suction centrifugal pump, electrically driven, located in a pit at one corner of the pool. This pump supplies 30,000 gal. per hour (at a cost of 11c.) through four inlets at the bottom corners of the main pool, so set as to create a circulating current. The rate of flow provides a complete change of water every 7½ hours. The overflow drains off through scum gutters to a pipe leading back through the seawall to the beach. Inlet water for the small pool enters through a central fountain.

This method of obtaining the water supply has proved to be excellent. Salt water is filtered through a stretch of sand varying from 20 to 100 ft., depending on the tide, before it reaches the well points. The underground supply contains about 20 per cent fresh water, which is sufficient to prevent the salt water from stinging the eyes of the swimmers. The temperature of the water is constant, about 68 deg. Army medical authorities have kept a constant check on the pool water and rate it as the best they have seen. No filters or chlorinators are necessary. Every 48 hours 5 lb. of copper sulphate are placed in a perforated can in front of one of the inlets at the shallow end of the pool to eliminate the growth of algæ. All swimmers must go through a shower and hypo foot bath before they can enter the pool. Once a week the pool is closed for twelve hours for a thorough cleaning. The actual cost of operation, except for two lifeguards, is 50c. per hour at night and 12c. per hour during the daytime.

High-silica cement was selected for the construction of the pool because of its high resistance to corrosion by sea water, as shown by laboratory tests. This product, with a high percentage of fines (59 to 62 per cent under 20 microns) and a colloidal activated silica in the cement, produced a concrete of high density and remarkable workability. Results justify its selection; the concrete has a fine smooth finish free of sand streaks, is of a pleasing color, and from tests appears to be practically impervious, indicating a long life. So well pleased were the local authorities with high-silica cement that it has been used as a test in 240 ft. of the big seawall now under construction.

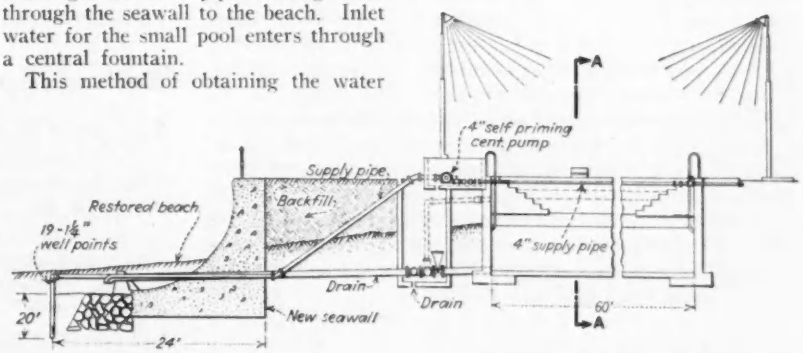
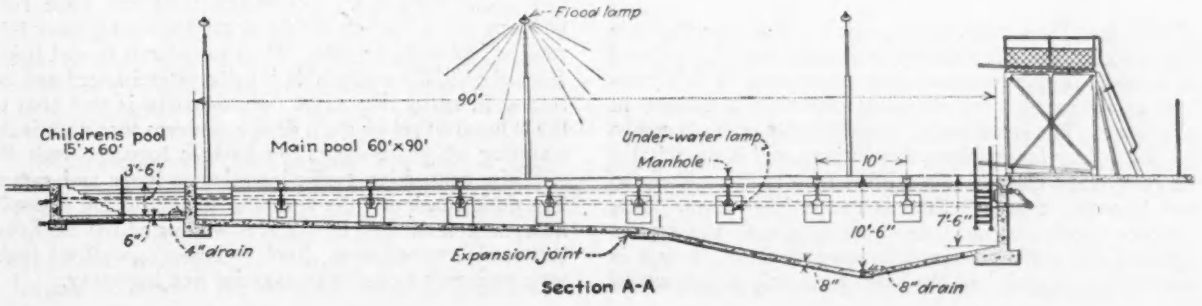


FIG. 2—DESIGN of Fort Monroe swimming pool, showing arrangements of well-point salt-water supply system.



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WHILE administration re-employment plans, especially through an active construction program, still remain veiled in secrecy, there are clear signs that the Washington leaders recognize the necessity of calling on construction for the principal contribution to emergency re-employment. When their plans are presented for adoption it is certain that they will require the immediate active participation of engineering organizations everywhere in the country, if rapid execution is to be possible. State, city and regional officials will be invaluable aids to the campaign if they are able to present definite projects, with designs and preliminaries complete for instant action. Thus, if a comprehensive grade-crossing budget is included, railroad engineers as well as city, state and county officials should be ready to set it in motion. Most immediately important is preparation for those classes of work that are adapted for quick use as winter possibilities. It is believed now that the Administration recognizes the need for having private engineers participate in this program, but the preparatory work rests on the initiative of public officials and engineers.

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A Fundamental Question

A FUNDAMENTAL QUESTION as to the limits imposed on governmental activities associated with navigation improvements has been raised by federal judge W. I. Grubb in Alabama in connection with his refusal to dismiss the action brought by stockholders of the Alabama Power Co. to stop the sale of part of their property to the Tennessee Valley Authority. Judge Grubb stated that "development of the Tennessee River Valley as a social experiment is in no sense related to improvement of navigation of the Tennessee River, or to national defense, or to the regulation of government-owned lands; and the production and sale of electrical power in aid of such development and experiment would not be incidental or related to the exercise of any of the constitutional powers named." In so saying, Judge Grubb has served to concentrate attention upon an issue that is fundamental not only to the operations of the TVA but also to other federal undertakings under the Recovery Act—notably Bonneville and Grand Coulee—as well as to the whole future of the government's relation to business enterprise. In the entry of the TVA into business in a proprietary capacity, not alone in power distribution but also in manufacture, the federal government goes beyond what is generally believed to be the lawful and intended function of the national government. It is eminently desirable that the subject be brought before the United States Supreme Court for early adjudication, for at no time in our history has the question of whether our system of law marks out a definite line between the fields of private enterprise and governmental administration been so challenging as today.

Belt and Bypass Roads

THE BELT HIGHWAY around St. Louis which is described in this issue represents a new road service being given by states to their large cities. St. Louis, Providence, Boston, Philadelphia and Chicago are among the cities at which costly projects of the kind are in progress. The significance of these bypass and interchange routes to both trans-city traffic and that entering and leaving city areas needs no emphasis. It is perhaps less obvious that the belt-highway movement introduces a new road classification, in respect to both structural characteristics and traffic purposes. Contrasted with the main road between cities, the belt road and the bypass highway take rank as interceptor roads. Their purpose is to sort traffic from the radials and enable it to be interchanged and rerouted in many directions. Particularly is this true of the belt road, and its main design problem therefore is the planning of grade-separation bridges together with the requisite connecting traffic-interchange loops and ramps. The design task and the resulting structures are exemplified particularly well by the illustrations of the St. Louis belt-road intersections. Such intersections afford highway engineers a chance to exercise fine ingenuity.

Putting Sewage-Sludge Energy to Use

SAFE AND ECONOMICAL disposal of municipal wastes constitutes one of the gravest problems of city life. To remove domestic wastes from the premises of the individual has been relatively simple, but the minds of engineer and pure scientist have been severely taxed to devise means of disposing of the community's accumulation. To an amazing degree their efforts have been successful, and it is now possible to remove from sewage nearly all of its pollution-bearing constituents before it is discharged into the natural drainage courses of the region. But what is to be done with those foul and dangerous substances that must be held back? Today's answer seems to be that the community's concentrated sewage wastes constitute a valuable source of energy that can be put to work with considerable community profit.

To unburden a sewage-treatment plant of its accumulated sludge has long been one of the most difficult phases of the sanitarian's art. Ever since sanitary practice has included the separation of suspended matter from sewage as an essential step in any method of treatment, considerable ingenuity has been employed to facilitate the discarding of this troublesome material. Noteworthy, therefore, is the current shift in emphasis in the sludge question from disposal viewed as merely getting rid of the stuff to disposal viewed as a means of exploiting the material's latent utilities.

Sludge-disposal methods have always been molded by the dominant sewage-treatment process. When the septic tank came into prominence a number of years ago, one of the merits claimed for it was that the solid matter deposited would consume itself completely through the action of fermentation. Although the performance of the device fell short of this extravagant claim, it did serve to demonstrate to the sanitary world the value of digestion for reducing the bulk as well as the noisome character of sewage sludge. Thus, because of the better advantage that could be taken of putrefactive action, the two-story tank came into widespread use and, later, separate tanks for sludge digestion. For some years sludge-disposal practice appeared to be stabilized, with digestion followed by sand-bed drying.

The development of the activated-sludge process brought with it a sludge problem of still greater severity, for it was soon found that the sludge produced by this process is extraordinarily bulky and resistant to digestion. The difficulties thus presented severely handicapped the activated-sludge process for a considerable time. Solutions were found, however, both in mechanical dewatering and in digestion aided by the admixture of primary-tank sludge.

How best to utilize the latent potentialities of sewage sludge has engaged the interest of sanitary engineers for a long time. The efforts in this direction include its use as fertilizer, heat generation by direct combustion and gas production by destructive distillation. At an early date the gas evolved by the action of the septic tank was collected and put to use. The increased quantities of gas produced by the digestion process and the greater ease with which the process could be controlled when separate digestion tanks were used stimulated the development of methods of gas utilization. For some time now practice has favored collecting the gas, burning it under water heaters and circulating the heated water through coils in the digestion tank. The warmed sludge has been found to digest faster, thereby cutting down the required digestion-tank capacity. Ordinarily, however, this procedure leaves a large surplus of gas, and many plant operators have had their consciences somewhat grieved by the necessity of burning gas to waste, in order to avoid odor nuisance.

Within the past few years considerable attention has been given in this country to the use of surplus gas to drive gas engines, providing power for plant purposes. It is to be noted in this connection, for instance, that Springfield, Ill., has for several years used sludge gas to drive the compressors operated in conjunction with its activated-sludge plant. Toledo has announced that the gas it has available is sufficient to operate its sewage-pumping station, and New York City has made plans for a new sewage-treatment plant for Coney Island at which the sludge gas will provide the power for sewage pumping.

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It can be remarked, of course, that these two lines of development are similar in that they utilize the potentialities of sludge by converting its latent chemical energy into heat energy and thence into useful work, but aside from this fundamental consideration they are essentially different. For power production from sludge-digestion gas there can be claimed the advantage of being operable with sludge in a fluid state, the condition in which it first appears on the scene. On the other hand, ultimate disposal must still be provided. Incineration gets rid of the sludge for good and all, but this advantage must be balanced against its dependence upon satisfactory dewatering. An interesting and valuable study could be made of the possibilities of combining the two methods to extract the maximum amount of energy. It is quite possible that partial digestion and gas utilization followed by dewatering and incineration would constitute an economical process and one that would utilize most efficiently the sludge's energy content.

Thus, the problem of today is how the material can best be put to use. Experience has already demonstrated that the gas from sludge digestion can be employed to produce a net gain in the power resources of the community and that incineration holds the possibility of similar gain. But the door to this special field of energy utilization has been but barely opened. Refinement of method and development of the maximum efficiency of exploitation will require a great amount of research and experiment and practical experience in operation. Further advance can be expected with complete confidence, and with it the modern community's least-respected product, sewage sludge, seems destined to contribute to the efficiency of a power age and thus prove of benefit to the world.

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A diverging line of development has proceeded from the use of mechanical dewatering devices. Recent refinements in equipment and operating methods have made possible the production of sludge cake containing so little water that it will support combustion unaided by added fuel. Experiments on incineration at Chicago have demonstrated the practicability of this method of disposal, and it has been officially adopted for the proposed extension of the Calumet plant. Further, the Chicago work holds out the possibility of steam generation by these incinerators and the attendant production of power for plant purposes. Full exploitation of the thermal value of sludge by incineration depends only on further improvements in dewatering processes.

It can be remarked, of course, that these two lines of development are similar in that they utilize the potentialities of sludge by converting its latent chemical energy into heat energy and thence into useful work, but aside from this fundamental consideration they are essentially different. For power production from sludge-digestion gas there can be claimed the advantage of being operable with sludge in a fluid state, the condition in which it first appears on the scene. On the other hand, ultimate disposal must still be provided. Incineration gets rid of the sludge for good and all, but this advantage must be balanced against its dependence upon satisfactory dewatering. An interesting and valuable study could be made of the possibilities of combining the two methods to extract the maximum amount of energy. It is quite possible that partial digestion and gas utilization followed by dewatering and incineration would constitute an economical process and one that would utilize most efficiently the sludge's energy content.

Thus, the problem of today is how the material can best be put to use. Experience has already demonstrated that the gas from sludge digestion can be employed to produce a net gain in the power resources of the community and that incineration holds the possibility of similar gain. But the door to this special field of energy utilization has been but barely opened. Refinement of method and development of the maximum efficiency of exploitation will require a great amount of research and experiment and practical experience in operation. Further advance can be expected with complete confidence, and with it the modern community's least-respected product, sewage sludge, seems destined to contribute to the efficiency of a power age and thus prove of benefit to the world.

CURRENT NEWS

Powers of the TVA in Regional Work Questioned by Court

THE right of the Tennessee Valley Authority to enter into regional development work and to support that work through the sale of electric power was questioned by Judge W. I. Grubb in the federal district court at Birmingham, Ala., on Nov. 28 in overruling a motion brought by the TVA for dismissal of a suit instituted by stockholders of the Alabama Power Co. to stop the sale of some of the power company's properties in northern Alabama to the TVA.

In deciding that the case should go to trial, Judge Grubb said, in part: "The United States is a government of enumerated powers, conferred on it by the Constitution in expressed terms or by necessary implication. No power is conferred upon it to engage in any private business unless incidental to some power specifically granted.

"A plan for the development of the Tennessee River Valley, as a social experiment, is in no sense related to the improvement of navigation of the Tennessee River, or to the national defense, or to the regulation of government-owned land, and the production and sale of electrical power in aid of such development and experiment would not be incidental or related to the exercise of any of the constitutional powers named.

"Even if the act of Congress itself does not infringe the Constitution, if the management of the Authority is mistakenly construing and administering the act by engaging under color of, but in excess of its terms, in an enterprise which is not authorized by the act, and which the Congress would not be authorized to enact, such administrative action should be enjoined as ultra vires of the corporation. As the contracts of Jan. 4, 1934, Feb. 13, 1934, and Aug. 9, 1934 (the contracts in question in the suit) were steps taken to carry out the ultra vires enterprise of the Authority in engaging as a public utility in the production and sale of electric power, within the limits of the state of Alabama, not in aid of the exercise of any constitutional power, they were taken without authority, and the completion of their performance should be restrained and the contracting parties restored to their former status, as far as may be possible.

"The exercise of the right of the Authority to produce electric power for use in its operations, in the improvement of navigation or any other constitutional power, and to sell any legitimate surplus power so created, should not be interfered with. The transaction and contract between the Authority and the Alabama Power Co. have no relation to such production of electric power or to the disposal of such a surplus. They are in aid of the broader project, viz., to furnish a yardstick in the interests of consumers of electric power, and help the development of the Tennessee River Valley, as a social experiment, by selling cheap electric power.

"The Tennessee Valley Authority, if the averments of the bill are sustained, is engaged in producing and selling electric power in Alabama, in an enterprise having no substantial relation to the improvement of navigation or any constitutional power, on an elaborate scale, building dams designed for maximum electric power production to increase surplus power; fixing rates and terms in displacement of state functions, with the declared purpose to increase the magnitude of the enterprise in future."

Immediately following the publication of Judge Grubb's findings the stockholders of the Alabama Power Co. who brought the original suit amended their bill of complaint and asked the court to issue a final decree as to the right of the TVA to carry on most of the activities it now is carrying on in the electric utility field.

Power conference called

Coincident with the publication of Judge Grubb's findings, the Public Service Commission of Alabama called a conference of representatives of all electric utilities doing business in the state to be held on Dec. 11 to consider the question of lowering electric rates in Alabama. In its call for the conference the commission said that the Tennessee Valley Authority has initiated in a substantial area in northwest Alabama an electric utility system in which rates are materially lower than the general level of similar rates upon the systems of privately owned electric utilities, and that in a proceeding which had just been heard the authority had furnished the commission with a comprehensive statement outlining the basis for its proposed rates. It stated further that it is of the opinion that the private utilities should make every effort to meet or reasonably approximate the rate standards now presented by the TVA.

Pennsylvania Engineers Join National Professional Society

The Pennsylvania Society of Professional Engineers on Nov. 28 unanimously voted to affiliate with the National Society of Professional Engineers, bringing the number of member state societies in the national body up to five. The other state societies which are members of the national organization are New York, New Jersey, Connecticut, and Illinois.

An advisory council of the National Society, formed to direct and correlate relations with other national organizations, has been organized by the National Society of Professional Engineers with the following membership: Ralph J. Reed, president of the National Council of State Boards of Engineering Examiners; C. F. Hirshfeld, chairman of the Engineers Council for Professional Development; J. P. H. Perry, director of the American Society of Civil Engineers, and A. E. Marshall, president of the American Institute of Chemical Engineers.

Joint Bid of $1.40 per bbl. Offered for Aqueduct Cement

Four southern California cement companies offered a joint bid of $1.40 per bbl. to provide the 5,000,000 bbls. of cement to be required by the Metropolitan Water District for the Colorado River aqueduct project. The $7,000,000 bid was submitted jointly by the California Portland Cement Co., the Monolith Portland Cement Co., the Riverside Cement Co., and the Southwestern Portland Cement Co.

This same group of companies also submitted bids on smaller orders, under separate specifications of the district, at $1.49 per bbl. for 1,250,000 bbl., $1.47 per bbl. for 2,500,000 bbl.; $1.45 per bbl. for 3,750,000 bbl. Under the latter specifications the Santa Cruz Portland Cement Co., San Francisco, bid $1.49 per bbl. on the 1,250,000 bbl. quantity. No action has been taken by the directors of the district indicating whether the 5,000,000 bbl. bid or the smaller quantities will be the proposal accepted.

Low Bid of $1,083,000 Received For Georgia Prison Building

The Struck Construction Co., Louisville, submitted the low bid on the Georgia State Prison work in Tattnell County, at the opening in Atlanta, Nov. 23, 1934, by J. Houston Johnson, PWA Administrator for the State. The low figure was $1,083,000, while the next lowest bid was by the George A. Fuller Co., Washington, which bid $1,097,700. The eleven bids of the general contractors were forwarded to Washington. There are no alternate bids which might affect relative standing of the respective bidders. The location of the work is about 50 miles from Atlanta. This PWA financed project is one of the largest concrete building jobs to be undertaken in the South for several years.

County Fails to Get Bids For $750,000 School Job

No bids were received when the Allegheny County board of education, Maryland, assembled to open bids on the proposed $750,000 high school building at Cumberland. On the call for bids, according to reports, a representative of the Northeastern Construction Co., Baltimore, stated that the company's bid was ready to be submitted, but would not be offered unless there were other bids received.

Contract of $1,289,000 Awarded For Building in Montreal

Contract for the extension to the Montreal Customs Examining Warehouse, an item in the Federal Public Works program of Canada, was awarded to A. Janin and Co., Ltd., Montreal, on its low bid of $1,289,855.

NRA Compliance Plan to Aid Enforcement of Construction Code

THE recent announcement that the Department of Justice will set up a special compliance and enforcement division to handle NRA litigation, under the direct supervision of a special assistant to the Attorney General, will assure the Construction Code Authority of the full cooperation of the government in demanding that all general contractors comply with each provision of the code or face quick punitive action.

The General Contractors Code Authority has privately contended for months that it required the strong and unquestioned support of the government in the prosecution of code violators, and the appointment of G. Stanleigh Arnold as special assistant to Attorney General Cummings, to handle compliance matters, will lead immediately to more aggressive enforcement of the general contractors' code. One of the first moves undoubtedly will be against those who have failed to register their work and pay the required assessment. The code authority already has ordered a complete check of registrations against the official list of construction projects financed by PWA, which check will quickly reveal any delinquents in this class of work.

It is expected that Assistant Attorney General Arnold will rapidly formulate a method of enforcement procedure by the government which will relieve code authorities of this responsibility and free to more closely police their respective industries with the assurance that the government will effectively deal with the code violations that they bring to light.

Bid depositories

The General Contractors Code Authority also is looking to approval of its bid depository plan by the Construction Code Authority, during the meeting in Knoxville this week. The plan is designed principally for the use of building contractors, and contemplates the appointment of impartial agencies, such as builders exchanges or trust companies, to act as the bid depositories and to do the necessary mechanical work. A maximum filing fee of $2 for each bid deposited would be required to cover expenses.

The divisional code authority has filed with the National Industrial Recovery Board additional data in opposition to the granting of the Mason Contractors Divisional Code Authority's application for a termination of the dual code assessment exemption contained in Administrative Order X-36.

Taxpayer Suit Holds Up Another City Power Plant

A taxpayer of La Plata, Mo., has filed suit in the local court attacking the validity of a $75,000 bond issue for a municipal light and power system. The city planned to open bids on the project Nov. 23 and had received a PWA loan and grant of $100,000 for the improvement program. The petition of the taxpayer contended that the $75,000 bond issue would create a liability in excess of the constitutional debt limit of the city.

Golden Gate Fender Unwatered and Foundation Rock Inspected

The completed fender ring for the south pier of the Golden Gate Bridge at San Francisco was pumped out Dec. 2 after the tremie concrete for the pier had been brought up to El.-35. One of the eight 5-ft.-diameter inspection wells that have been left in the concrete was equipped with an air lock and unwatered under about 50 lb. of air pressure. Russell Cone, resident engineer, and several others made the first in-the-dry inspection of the foundation rock at about El.-100. The lower ends of these inspection wells bell out to a 15-ft.-diameter semi-spherical shape. As soon as air locks can be fitted to the other seven wells, they will be used for additional inspections of the foundation rock over the pier area.

When the ring was unwatered, there was very little leakage through the fender. According to present plans, the pier is to be completed to El. 40 and ready for the beginning of steel-tower erection about Jan. 1. This indicates apparently, that no further excavation into the foundation rock is contemplated, although it could be carried out through the wells which were provided for this eventuality.

Winter Work Program at Buffalo

To provide winter employment Buffalo, N. Y., has approved a $2,350,000 program of water main repairs and improvements. It is estimated that $1,947,000 of this fund will be spent for labor on repair work and $403,000 will be used for the construction of a new main.

Lots Drawn to Award Contract After Identical Bids Are Received

Drawn by lot, a contract for 21,000 tons of sheet steel piling was awarded Nov. 30 to Inland Steel Co. by the Bureau of Reclamation after five identical bids of $1,180,401.40 had been received for this large order of material, to be used in constructing the cofferdam for the Grand Coulee Dam on the Columbia River. "It's the code and it's a fair price," was the comment of a bureau official concerning the identical bids received from Inland, Illinois, Jones & Laughlin, Bethlehem and Carnegie. The lottery marked the failure of attempts by the administration to break up identical bidding. The steel companies ignored President Roosevelt's order of last June authorizing bidders on government contracts to cut as much as 15 per cent from prices on file with code authorities.

Secretary Ickes has sought to engender competition by parceling out the business when identical bids were received. It was his idea that the government could at least save some freight by placing orders with plants nearest to the point of delivery. However, as far as steel is concerned, this possible saving is blocked by the basing point system of computing the freight bill. On the consignment of steel piling from Chicago, for example, the government will pay the freight from Buffalo. Further, Comptroller General McCarl objected to the plan by ruling that the law did not contemplate such procedure and that splitting orders between bidders might only encourage bidders to agree on prices.

GERMANY BUILDS EXPRESS HIGHWAYS

A long tangent on the express highway system under construction by the German Government. The two 25-ft. lanes are separated by a wide grass strip and flanked by 5-ft. shoulders. Constructed and maintained by a special government organization this system (*autobahnen*) is expected to provide employment for more than 500,000 men. The first part of the program provides for building 3,800 miles. An outline of the express highway system appeared in *ENR*, July 5, 1934, p. 10.

Power Rights at Aurora Landing Dam Site To Be Acquired by the TVA

THE directors of the Tennessee Valley Authority have concluded an arrangement with the Southern Industries & Utilities Co. for the evaluation of that company's property on the lower Tennessee River near what is known as the Aurora Landing dam site. The valuation is to be made by the Federal Power Commission, before which the Southern Industries & Utilities Co. has pending an application for license to construct a power dam.

Some years ago the company procured a preliminary permit from the commission to engage in work preliminary to the construction of the dam. Two months after the creation of the TVA it applied to the commission for a license and the TVA immediately entered a protest on the ground that the development of the site by a private company would interfere with the unified development of the river.

The Aurora Landing dam site is the lowest one on the river. Construction of a dam there would form a pool extending back to the Pickwick Landing dam site at which point the TVA expects to begin construction of a dam in the near future, as noted in *ENR*, Nov. 29, p. 710.

Because of its close proximity to the Ohio River, floods in the Ohio frequently will result in the almost complete submergence of the dam at Aurora Landing, hence no dependable continuous power can be developed at that site. However, at times when that site is submerged, there generally is high water in the Tennessee and hence ample power at the plants farther upstream. For this reason the TVA considered it essential that the power plant at the Aurora Landing site be tied in to its system of power plants on the upper river.

Providence Engineering Society Opens New Home Without Debt

The Providence Engineering Society, a 40-year old engineering organization at Providence, R. I., dedicated its new society building on Nov. 28. An unexpected announcement of the dedication meeting, was that the building and its furnishings are entirely free of debt as a result of the generosity of the family of John R. Freeman, an honorary member and past president of the society. The Freeman family, in addition to paying off the building debt and furnishing the library, started the library by six shelves of books from the personal collection of Mr. Freeman.

The dedication dinner was attended by sixteen past presidents of the society. Speakers at the exercises included Karl T. Compton, president of Massachusetts Institute of Technology; Robert W. Adams, first president of the society in 1894; Frank Winsor, past president, and E. F. Walsh, president of the society.

New Boston-Lowell Highway Route Recommended in Report

A new state highway link between Boston and Lowell, avoiding densely populated centers and costing about $4,755,000, has been recommended by the Massachusetts Department of Public Works in a special report to the legislature. The connection would begin at Arlington, about 8 miles northwest of Boston, and traverse the outskirts of Lexington, Burlington, Bedford and Billerica. A 100-ft. roadway is advised except in Arlington, where an 80 ft. width would be more feasible on account of land damages. The length of the proposed route is about 18 miles. Besides furnishing an outlet for direct Boston-Lowell traffic the highway would provide quick access between northeastern Massachusetts and points west via the new Cambridge-Concord road, now rapidly approaching completion (*ENR*, Nov. 8, 1934, p. 590).

FHA Issues Guide to Builders On Policy for Making Loans

As a guide to lenders and borrowers under its home mutual mortgage insurance system, the Federal Housing Administration has issued a manual establishing minimum requirements with which property much conform to render the mortgage eligible for insurance and defining standards for eligible property that will give a favorable rating to the mortgage covering it.

As custodian of the fund into which insurance premiums are paid by borrowers, FHA must eliminate, as far as possible, the risks to which these funds are subjected. Mortgage insurance will be made available, therefore, only to properties whose prospects of continued utility are sufficiently good to recommend them as sound investments throughout the life of the mortgage, generally 20 years.

In addition, the National Housing Act definitely places upon FHA the responsibility to encourage improvement in housing standards and conditions and FHA's policy assumes that, in long-term investment, the qualities which produce a satisfactory social condition also tend to assure economic soundness.

Durable structures

FHA intends that mortgages insured under its program shall be upon dwellings which are substantial and durable in structure, convenient and efficient in arrangements, attractive in appearance and appropriate to their neighborhood. It intends that insured mortgage dwellings shall be placed only in neighborhoods which possess considerable security from disintegrating influences which are more certain to destroy property values than defects in the buildings themselves. The same standards will be applied to existing buildings both as to structure and neighborhood as to new buildings, as FHA holds that insuring continued financing of existing substandard housing would imperil the whole program for development of better housing conditions and of sound housing finance.

Consolidation of Mapping Agencies Is Forecast

(Washington Correspondence)

CONSOLIDATION of the principal map-making agencies of the government is favored by President Roosevelt and probably will be accomplished soon. The President was impressed by the recommendations of the Science Advisory Board and it is understood that the reorganization may be effected by executive order. The science board's report has been referred by the President to Secretaries Roper, Ickes, Dern and Hull in order that they may prepare for the changes proposed. Reorganization will also involve adjustment of the budgets of the departments concerned and it is expected that the President's order will be issued when the Budget Bureau has set up its books on the new basis.

Consolidation of the Coast & Geodetic Survey, the topographic branch of the Geological Survey and several minor map-making agencies is contemplated. Various agencies engaged in making surveys and maps for special purposes will not be directly affected although greater coordination of all the Government's mapping activities is the objective.

In some phases of its long-time planning, the administration has been handicapped by lack of maps. Provision of more adequate funds for this purpose is expected to follow the proposed reorganization. With the recognition that the importance of mapping has finally received at the hands of the administration, a rapid completion of the geodetic net and the topographic map of the United States, which has lagged far behind the need for such mapping in many sections of the country, is expected to become a major project in the Administration's program.

Dallas to Study Sewage Problem As Land Owners Threaten Suit

Technical opinion has been sought by Dallas, Tex., to assist in finding a solution to a pressing problem of sewage disposal, as city and levee district engineers have failed to agree over abatement of the discharge of the city's raw sewage on reclaimed river bottom lands. The levee land owners threaten to press prosecution of a suit, filed over a year ago, for $600,000 damages resulting from the discharge of city sewage and storm waters on their property.

O. H. Koch, public works director, contends that a new $50,000 pump, soon to be installed at the Cadiz sewerage pump plant, will expedite the movement of sewage through the crowded main line sewer in the river bottoms and prevent its leakage. Over a year ago, the levee owners agreed to give this pump a trial.

Levee district land owners demand that the city do one of three things: (1) Build a new $100,000 main line sewer through the river bottoms, (2) install a smaller cutoff sewer to carry part of the sewage or (3) order Highland Park and University Park to stop turning sewage into the Dallas system.

Washington Notes

By Paul Wooton
Washington Correspondent

The contract for Rye Patch Dam, on the Humboldt reclamation project, Nevada, has been awarded to A. A. Terteling & Son, Boise, Idaho, for $256,322. It will be an earth dam with rock face and will be 65 ft. high and 650 ft. wide.

Allotments made during the past week by PWA are as follows: $25,000 to the National Park Service for a study to eliminate pollution of Rock Creek in Maryland and District of Columbia; $48,000 to the War Department for repairs and improvements to Waterton, Mass., arsenal; $80,000 to Corps of Engineers for deepening Lake Worth Inlet, Florida, to a depth of 20 ft., $677,000 to the Department of Agriculture for the control of Dutch Elm disease in the New York area; $5,000 allotted for installation of navigation aids, Chincoteague Bay, Ocean City and Sinepuxent River, Maryland and Virginia, by transfer from unexpended balance of previous allotment, to the Bureau of Lighthouses. An allotment of $180,000 for removal of Morro Castle from the New Jersey coast has been returned by the Navy Department, as the War Department has undertaken the work with other available funds.

Loans for low-rent housing

Long time mortgage loans on low rent housing projects up to the full value of the buildings, exclusive of land may be insured under the National Housing Act, according to regulations issued by the FHA. Capitalization of such projects is limited to actual investment by the stockholders. On this they may receive regular annual dividends not to exceed six per cent and special disbursements not to exceed 2½ per cent a year, provided an amount equal to that paid in such special disbursements is returned to tenants in the form of rebates or rent. The regulations provide that no capital stock of low rent housing corporations be retired during the life of the mortgage. To be accepted as insurable risks in excess of 80 per cent of its value, a property must be exceptionally well located, the corporation must have not less than three per cent working capital and an equity in the completed property not less than the value of the land.

As with insured loans on individual homes, loans on low rent projects will be segregated as to type and amount of risk involved, thus placing a premium on the sounder projects and good management.

FHA's policy does not contemplate coupling low-rent housing with slum clearance where the price of the land is dictated by other anticipated uses than housing, and demolition adds to the cost. Except where such excess costs can be covered by public grants or private gifts an insurable type of project will only rarely be possible on such lands. Municipal and other governmental authorities which may receive grants are also eligible sponsors for insured projects, according to Miles L. Colean, FHA, technical director.

Low rent housing plans which the FHA has been asked to approve total $102,000,000. Ten of them totaling $27,000,000 are maturing. The FHA invites informal as well as formal application.

Preliminary Work Continues On Grand Coulee Project

Marked by the placing in service of the 34.5 mile construction railroad to the site on Dec. 8, preliminary operations on the Grand Coulee dam project continued to advance and widen in scope.

The construction railroad, as planned and built by the government, extends to the near side of the river at the site, and the contracting organization is preparing plans for a steel bridge which will carry the railroad across the Columbia River to their construction headquarters on the other side. Bids for this work are expected soon. The construction of this river crossing will involve the driving of a short tunnel. In the meantime, the contractor has completed and placed in operation a wood pile bridge across the river to provide for trucks.

About 2,300 men are now employed on various phases of the construction operations. As part of the preliminary work a mile-long conveyor belt is being installed which will be the principal means of transporting the millions of cubic yards of overburden and excavation from the site to disposal areas. Construction of the cofferdam is expected to start about the first of the year; winter is the annual low flow period of the Columbia River. Bids for cement are expected to be called about Jan. 1. On Dec. 21 bids will be received for the construction of the administrative building for the U. S. Bureau of Reclamation forces. This will be a one-story structure 48x144 ft. in area. In the townsite occupied by the forces of the bureau, work has started on the second group of buildings, including 14-three-room and 16- four-room houses for members of the engineering organization.

Federal Public Building Program Is Half Under Construction

The $69,237,000 federal public building program covered by PWA funds allotted a year ago has progressed until it is now almost half under construction. The Treasury Department reports 138 projects, totaling $31,248,000 under contracts; and bids in, on market or in specification stage for 102 projects totaling $13,020,000. In the drawing stage are 91 projects totaling $9,825,000 in the hands of the supervising architect and 61 projects totaling $6,506,000 in the hands of private architects. Sites have been selected and surveys ordered for 24 projects totaling $2,938,000 and sites have been advertised for, examined or awaiting selection for 33 projects totaling $5,691,675.

About half of the 338 projects covered by a direct appropriation by Congress of $65,000,000 last June now are in the drawing stage. The supervising architect's office is preparing the plans for 126 projects totaling $16,569,000; private architects, 32 projects totaling $16,055,000. Sites have been selected and surveys ordered on 70 projects totaling $9,319,500. Sites have been advertised for, examined, and awaiting selection on 45 projects totaling $9,831,000. Four projects totaling $625,500 are under contract; bids are in, on market or in specification stage covering 61 projects totaling $12,387,000.

Harlow S. Person Named to Head Water Section of Resources Board

Secretary Ickes has named Harlow S. Person acting director of the water resources section of the National Resources Board, and acting chairman of the Water Planning Committee, to succeed Morris L. Cooke, resigned. Mr. Cooke retains his membership on the National Power Policy Committee. Mr. Person is a New York specialist in the field where economics, engineering and management overlap. He is on the lecture staffs of Columbia University and of the State University of Iowa and was director of the Amos Tuck School of Administration and Finance at Dartmouth College.

The Water Planning Committee presented its report on the Mississippi Valley to President Roosevelt recently and has prepared the inventory of national water resources which will go to the President as a part of the report of the National Resources Board.

John Jaster Appointed Director of Ohio Highway Department

John Jaster, Jr., division engineer, Cuyahoga County, Ohio, Department of Highways, has been named director of the department by Governor-elect Martin L. Davey to succeeed O. W. Merrell.

Mr. Jaster is a civil engineering graduate from Case School of Applied Science in the class of 1908, studied law at Cleveland for a year after graduation and then went into contracting, first with J. C. Dunn and then with George A. Rutherford. In 1913 he helped form the contracting firm of Uhl-Jaster Company, Cleveland, and was actively interested in that company until 1933 when he accepted his present position with the state highway department.

Mr. Jaster has been active in contracting association affairs and in the Cleveland Builders Exchange and Real Estate Board.

SOCIETY CALENDAR

AMERICAN ENGINEERING COUNCIL, annual meeting, Washington, D. C., Jan. 10-12.

AMERICAN ROAD BUILDERS, annual convention, Washington, D. C., Jan. 22-25.

AMERICAN SHORE AND BEACH PRESERVATION ASSOCIATION, annual meeting, Washington, D. C., Jan. 10.

AMERICAN SOCIETY OF CIVIL ENGINEERS, annual meeting, New York, Jan. 16-18.

CANADIAN CONSTRUCTION ASSOCIATION, annual convention, Montreal, Que., Jan. 29-31.

HIGHWAY RESEARCH BOARD, annual meeting, Washington, D. C., Dec. 6-7.

NATIONAL PAVING BRICK ASSOCIATION, annual meeting, Indianapolis, Ind., Feb. 7-8.

Personals

LT.-COL. C. L. STURDEVANT, district engineer, Corps of Engineers, Seattle, Wash., has been relieved of this assignment and ordered to duty in the Philippine Islands.

OLIVIER DESJARDINS, who was joint chief engineer of the Provincial Department of Public Works of Quebec, has been ap-

pointed chief engineer succeeding Ivan E. Vallee.

DONALD C. MCMILLAN, city engineer of Ventura, Calif., for several years, has been appointed city manager to succeed A. E. Stockburger, who resigned to become California State Finance Director.

J. F. MILLER was elected president of the Dravo Contracting Co., Pittsburgh, Pa., at a recent meeting of the board of directors of the company. V. B. EDWARDS was elected executive vice-president.

D. W. MCMORRIS, for more than 25 years a member of the city engineering staff of Seattle, Wash., and during recent years instrumental in developing the successful fill-and-cover program of garbage disposal in that city, retired on pension Dec. 1 at the age of 70.

Obituary

E. A. HOAVE, a pioneer in Canadian railway building, particularly during the period 1870 to 1890, died in Quebec Nov. 23 at the age of 88.

GEORGE L. HESS, hydraulic engineer, developer of the Hess type of metal flume and president of the Hess Engineering Co., Tulsa, Okla., died in Albuquerque, N. M., Nov. 23, at the age of 60. He was serving as representative of the RFC for several states in the Southwest with headquarters at Albuquerque. His technical education was received at the Universities of Missouri and Wisconsin.

RALPH E. CHAPMAN, engineer and marine salvage expert and son of the founder of the Merritt-Chapman & Scott C[orp.] was killed in an automobile accident [in] Miami, Fla., Nov. 27. He was 46 yea[rs] of age. A graduate of Cornell Universit[y] he spent several years with his father's company. More recently he had been associated with a group doing similar wor[k] known as the J. F. & R. Corporation, [in] Philadelphia and New York.

ALFRED WEEKES SZLUMPER, well know[n] British authority on railways and for sev[-] eral years chief engineer of the Souther[n] Railway until his retirement in 1927, die[d] in London recently at the age of 76. He had a long and varied career in railroa[d] engineering in England and India. One [of] the senior members of the Institution [of] Civil Engineers, Mr. Szlumper, was the recipient of several awards of that organization, including the Telford Gold Medal.

CONSTRUCTION STATISTICS OF THE WEEK

ENGINEERING construction awards total $26,238,000 for the week, $23,944,000 for public work and $2,294,000 for private construction. Of the public work, $6,850,000 represents federal awards and $17,094,000 state and municipal. These totals are higher than the average December week last year except for private construction which is 72 per cent lower. The total for the week is higher than the average week to date for this year, $24,565,000.

Compared with the 4-day volume reported last week all classifications are higher except commercial buildings. Totals for the week according to classification are: waterworks, $2,280,000; sewerage, $1,312,000; earthwork, irrigation, drainage, waterways, $6,553,000; bridges, $2,262,000; streets and roads, $6,901,000; public buildings, $4,016,000; commercial buildings, $265,000 and industrial buildings, $1,799,000.

The larger contracts for the week include foundations for a $1,000,000 sugar refinery at Clarksburg, Calif., for Amalgamated Sugar Co., Ogden, Utah; the administration building at the University of Texas, Austin, $1,590,000; highways by Ohio, $482,000, by Georgia, $532,000 and by Tennessee, $546,000; bridges by state highway departments of Louisiana, $665,000, of New York, $468,000, and of Ohio, $535,000; dike for Quabbin Reservoir in Enfield and Ware, Mass., $1,446,000 and Tygart River Dam, W. Va., $6,306,000.

In addition to $6,163,000 in direct municipal bond sales the market absorbed $7,098,000 in PWA and RFC bonds sold by the RFC. This makes the fifth group of bonds sold in the market by RFC involving a total of $25,490,000 plus the profit on the sales which will be returned to the revolving PWA fund, in accordance with the law.

CONTRACTS
(Thousands of Dollars)

	Weekly Average Dec. 1933	Prev. 4 Weeks	Week Dec. 6 1934
Federal Government	$5,132	$6,332	$6,850
State and municipal	12,241	16,724	17,094
Total public	$17,349	$23,057	$23,944
Total private	8,267	3,826	2,294
Week's total	$25,641	$26,883	$26,238
Cumulative to date:			
1933 $989,259	1934 $1,203,682		

NEW PRODUCTIVE CAPITAL
(Thousands of Dollars)

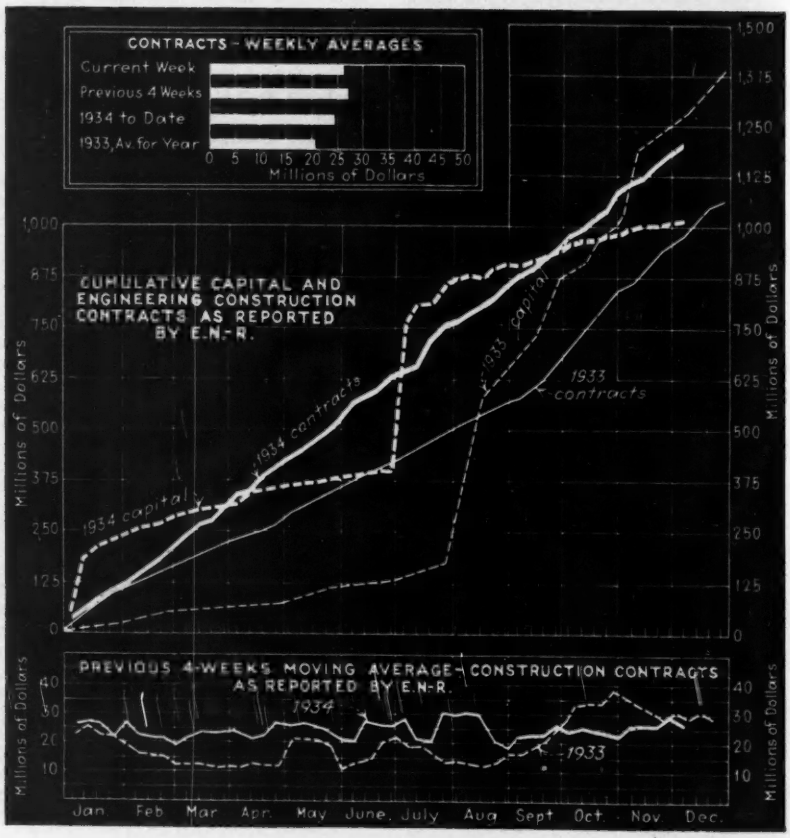
1934	Week Dec. 6	Cumulative
State and municipal	$6,163	$329,254*
PWA allotments, S&M	....	588,834*
RFC loans, S&M	....	23,140*
Corporate issues	....	21,860*
PWA allotments, private	....	53,418*
Total, Non-Federal	$6,163	$1,016,506
PWA allotments, Federal Constr.	....	193,690
Total new capital	$6,163	$1,210,156
Cumulative to date:		
1933 $1,280,292	1934 $1,016,506	

*Includes transfer from PWA and RFC classifications to private capital of $25,490,000 bond sales by RFC.

Note: These figures include private bonds, and stocks sold for productive purposes; state and municipal bonds for construction; PWA loans and grants to states and municipalities, including the special highway funds; PWA private loans, and allotments for Federal construction.

INDEX NUMBER

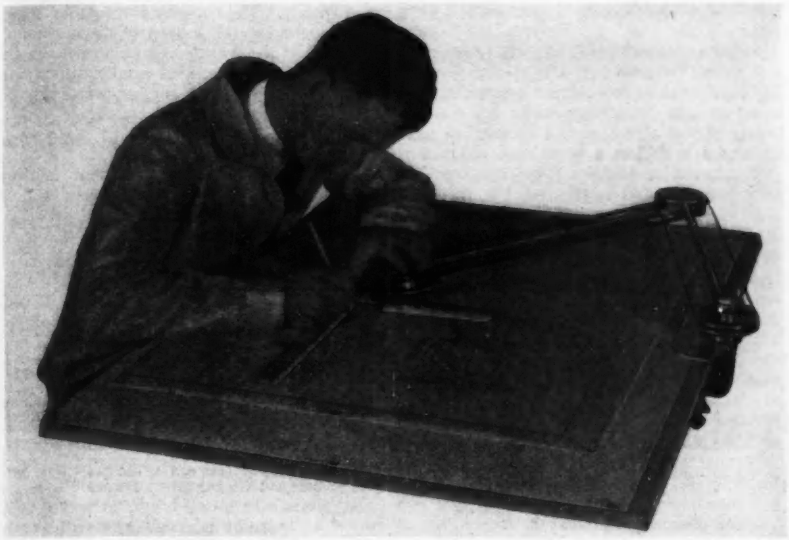
E.N.-R.- Cost	1913 = 100	1926 = 100	E.N.-R.- Volume	1913 = 100	1926 = 100
Dec., 1934	201.86	97.03	Nov., 1934	115	50
Nov., 1934	201.36	96.76	Oct., 1934	98	44
Dec., 1933	192.14	92.36	Nov., 1933	133	58
1933 (Av.)	170.18	81.80	1933 (Av.)	102	45
1932 (Av.)	156097	75.45	1932 (Av.)	127	56
1931 (Av.)	181.35	87.17	1931 (Av.)	220	96.5


CONTRACTS - WEEKLY AVERAGES
Current Week
Previous 4 Weeks
1934 to Date
1933, Av. for Year
0 5 10 15 20 25 30 35 40 45 50
Millions of Dollars
CUMULATIVE CAPITAL AND ENGINEERING CONSTRUCTION CONTRACTS AS REPORTED BY E.N.-R.
1934 capital
1934 contracts
1933 capital
1933 contracts
Millions of Dollars
PREVIOUS 4-WEEKS MOVING AVERAGE - CONSTRUCTION CONTRACTS AS REPORTED BY E.N.-R.
1934
1933
Jan. Feb. Mar. Apr. May June July Aug. Sept. Oct. Nov. Dec.

Construction Equipment and Materials

New Drafting Machine of Aluminum Alloy

Embodying mechanical features which, it is said, save considerable drafting time, a new drafting machine has been announced by the Charles Bruning Co., Inc., New York, N. Y. The machine is known as the Bruning-Wallace drafting machine.



Bruning-Wallace drafting machine

The machine is equipped with five precision ball bearing assemblies, each of which is totally inclosed. They are lubricated and sealed at the factory, requiring no cleaning or lubrication during the life of the machine. All cast parts are of heat-treated aluminum alloy.

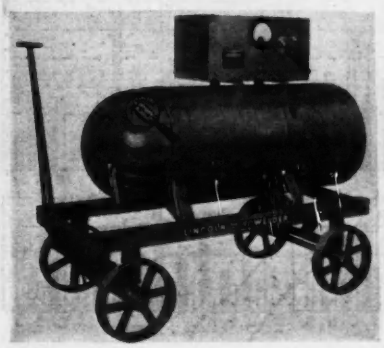
The machine is available in two models: the standard, for mechanical or architectural draftsmen, and the civil engineer's model, for map draftsmen and navigators.

Alternating Current Welder of Motor-Generator Type

The Lincoln Electric Co., Cleveland, Ohio, announces a new alternating current welder which will be known as the Lincoln "Shield Arc AC." This new welder is of the motor-generator type which takes two-phase or three-phase alternating current of standard voltages and frequencies and converts it into alternating current of lower voltage and at that higher frequency most suitable for arc welding.

The new welder is built in portable and stationary a.c. motor driven models in two sizes. The smaller capacity machine can be used for continuous welding with electrodes of $\frac{3}{32}$ in. to $\frac{5}{16}$ in. in size; the larger welder handles electrodes from $\frac{1}{4}$ in. to $\frac{3}{8}$ in. in size. The machines are wired for 220, 440 or 550 volts, a.c. supply, two or three phases, 50 and 60 cycles.

Lincoln Electric Co.'s alternating current welding machine



New Equipment in Brief

Ratchet Wrench. A new model of the Favorite reversible ratchet wrench has been announced by Greene-Tweed & Co., New York, N. Y. The new model is constructed of a stronger and tougher metal, the manufacturer states. The ratchet is provided with a cadmium finish. Handles and heads have been regrouped so that all awkward combinations and duplications have been eliminated.

Air Hose. The Electric Hose & Rubber Co., Wilmington, Del., has recently developed two new types of air hose. Portable-compressor hose is designed for direct-connection to portable air compressors or for other service where excessive amount of oil may be blown into the hose. Rock-drill hose has been developed especially for service in mines, quarries, construction work, etc., where the outer surface of the hose is constantly subjected to severe treatment.

Concrete Mixer. A new lightweight concrete mixer of 7 cu.ft. capacity has been announced by The Koehring Co., Milwaukee, Wis. The machine comes in two types, one for side discharge, and the other for end discharge. The former has a weight of 2,870 lb., and the latter a weight of 2,950 lb. The light weight has been attained through the use of high-strength alloy steel.

Gate Valves. Jenkins Bros., New York, N. Y., announces a new waterworks iron body gate valve with a key-operated stuffing box that can be serviced from the street level. The valve is made in two patterns: double disc, parallel seat and solid wedge.

New Publications

COLUMBIA MANUAL OF CONCRETE CURING, the Columbia Alkali Corp., Barberton, Ohio. 4x7, 56 pages, plus note space.

VERTICAL NON-CLOG OPEN SHAFT ECONOMY PUMP, the Pumping Machinery Co., Chicago, Ill. 8½x11, 16 pages.

DOUBLE ACTING PILE EXTRACTOR, McKiernan-Terry Corp., New York, N. Y. 8½x11, 8 pages.

BELT AND MOTOR DRIVEN COMPRESSORS, Schramm, Inc., West Chester, Pa. 8½x11, 12 pages.

AQUAGEL GROUTING MIXTURE, California Talc Co., Los Angeles, Calif. 8½x11, 8 pages.

RESEARCH MICROSCOPES, Bausch & Lomb Optical Co., Rochester, N. Y. 6x9, 24 pages.

VIBRATION, A BETTER METHOD OF PLACING CONCRETE, Portland Cement Association, Chicago, Ill. 6x9, 32 pages.

BLASTING DITCHES WITH EXPLOSIVES, R. I. duPont de Nemours & Co., Inc., Wilmington, Del. 6x9, 48 pages.

WHAT ABOUT YOUR ROOF? Johns-Manville Corp., New York, N. Y., 8½x11, 12 pages.

A ONE-MAN PROSPECTING CORE DRILL, Sullivan Machinery Corp., Chicago, Ill. 8½x11, 8 pages.

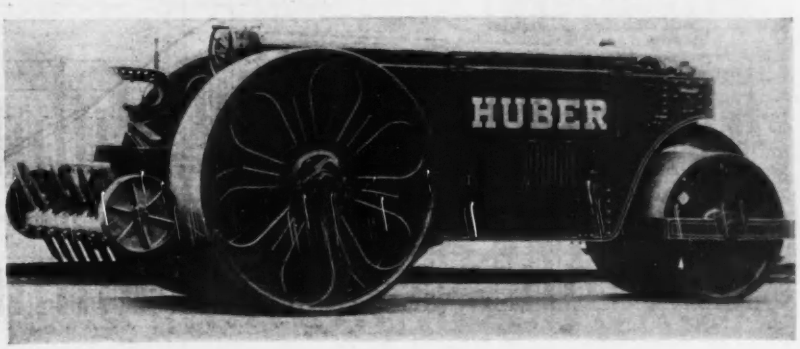
HIGH TENSILE STEEL, United States Steel Corp., Pittsburgh, Pa. 8½x11, 8 pages.

New Road Roller Controlled Hydraulically

The Huber Mfg. Co., Marion, Ohio, has announced a new 6 cylinder, 3 speed, hydraulically controlled road roller. Power is furnished by an industrial type engine developing 59 hp. at 1,200 r.p.m.

The roller is equipped with a new dual gearing control providing a hydraulic-power steel that can be changed quickly to hand-steering.

Huber road roller



BUSINESS SIDE OF CONSTRUCTION

November Awards Higher—Increase in Federal Construction

ALTHOUGH 19 per cent heavier than in October, engineering construction awards failed by 9 per cent to come up to the total for November, 1933. The total volume of awards for November, 1934, is $134,415,000, of which $115,283,000 is for public work and $19,132,000 for private work. Federal awards are $31,662,000 for the month. The cumulative total for the eleven months period is $1,177,444,000, 22 per cent higher than for the same period in 1933. Public awards for eleven months show an increase of 43 per cent over last year, while private awards lag 27 per cent behind a year ago. In November, private awards were above last year.

The volume index for November is 115 compared with 133 a year ago, a decrease of 13.5 per cent when adjustment is made for the higher cost of construction this year.

Highway awards are lower than last month and considerably lower than a year ago. Public buildings awards are higher than last month and only slightly lower than last year. Industrial buildings are slightly higher than last month and approximately equal to last November while commercial buildings are ahead of last month but materially lower than a year ago.

Territorially, Middle West construction awards fell behind last month but all other territories show an increase over October. New England and Far West show a gain over last year.

New Capital

The municipal bond market continued strong during November with sales for construction purposes totalling $26,831,000. Net additions to PWA allotments were only $1,524,000 for the month.

The municipal bond market since August has paid a premium for municipal bonds originally purchased by PWA and RFC and sold through the Reconstruction Finance Corporation. The amount involved in this transfer from federal to private financing is $25,490,500 including $3,604,000 in Railroad loans. The transfer from public source to private capital source of "new capital" is made in the weekly report on new capital in this issue. The bond market this month has been strong with higher prices for the preferred issues.

Material Notes

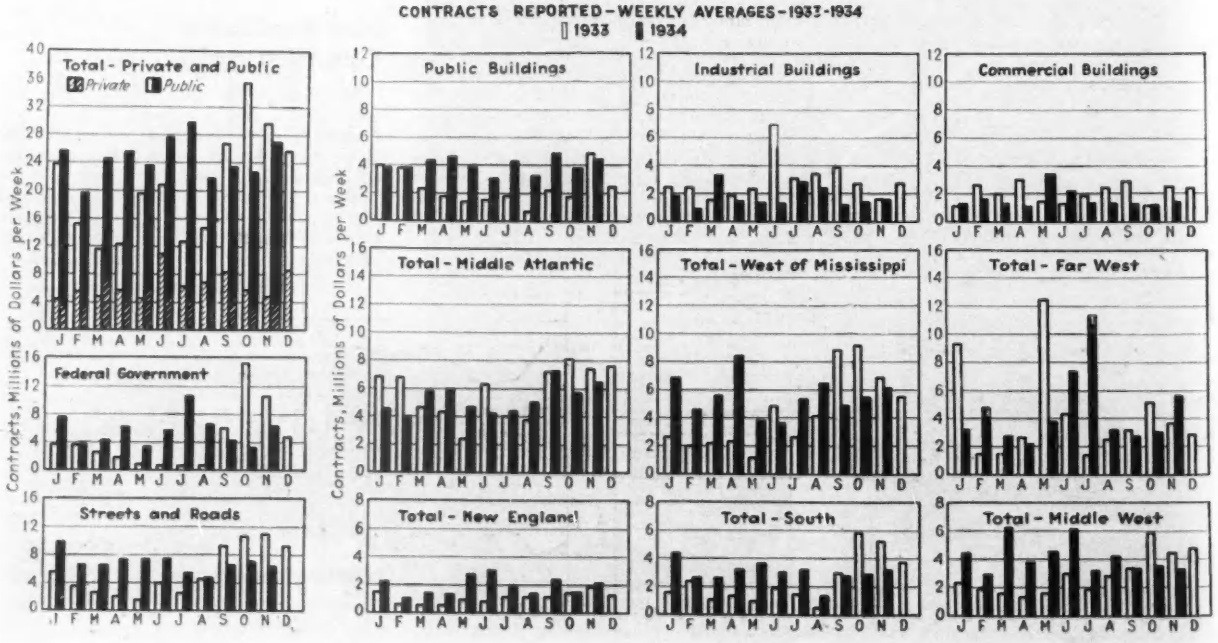
Cement—Shipments of cement in September totalled 7,388,000 barrels and in

ENGINEERING CONSTRUCTION CONTRACTS REPORTED IN NOVEMBER, 1934

Five Weeks—Thousands of Dollars (000 omitted)

	New England	Middle Atlantic	South	Middle West	West of Mississippi	Far West	United States Nov. 1934	United States Eleven Months 1934	United States Eleven Months 1933	Canada Nov. 1934
Public Works										
Waterworks	300	1,015	513	390	1,464	17,369	21,051	78,404	65,814	52
Sewerage	1,737	2,120	397	1,616	916	469	7,255	56,242	17,837	779
Bridges, public	851	1,277	568	551	1,859	423	5,529	83,492	76,340	.....
Earthwork and waterways	529	147	6,698	2,907	11,865	668	22,814	170,850	125,958	228
Streets and roads	3,356	5,988	4,423	4,477	9,739	3,792	31,775	323,766	251,314	1,059
Buildings, public	2,515	9,903	1,395	1,630	2,437	3,893	21,773	187,925	111,716	494
Unclassified, public	37	3,888	292	251	101	517	5,086	59,409	20,665	975
Total public	9,325	24,333	14,286	11,822	28,381	27,131	115,283	960,088	669,644	3,587
Federal gov't (included in other classifications)	849	7,326	7,187	1,410	12,981	1,909	31,662	262,251	198,089	.....
Private										
Bridges, private	.....	351	.....	.....	.....	.....	351	10,044	12,483	.....
Buildings, industrial	957	1,100	950	4,036	710	610	8,363	88,070	141,401	862
Buildings, commercial	365	5,860	382	578	.....	.....	7,185	77,622	96,897	.....
Unclassified, private	121	569	448	107	1,580	409	3,233	41,620	45,381	145
Total private	1,443	7,880	1,780	4,721	2,290	1,018	19,132	217,356	295,162	1,007
November, 1934 (5 weeks)	**10,768**	**32,218**	**16,066**	**16,543**	**30,671**	**28,149**	**134,415**	.....	.....	**4,594**
October, 1934 (4 weeks)	6,144	23,007	11,418	14,814	22,669	12,449	90,501	.....	.....	.....
November, 1933 (5 weeks)	9,660	36,967	25,775	22,653	34,194	18,197	147,445	.....	.....	6,083
Eleven months, 1934	93,932	254,738	143,179	202,798	266,242	216,555	.....	1,177,444	.....	43,231
Eleven months, 1933	53,522	268,133	108,636	131,983	203,450	200,082	.....	.....	965,806	32,936

CONTRACTS REPORTED—WEEKLY AVERAGES—1933-1934



October 8,439,000 barrels. Production for these months was 7,680,000 and 6,675,000 barrels respectively. September production was a 36.2 per cent increase and shipments a 13.4 per cent increase compared with September, 1933. In October, production was a 32.5 per cent and shipments a 25.0 per cent increase over October, 1933. Portland cement stocks at mills were 2.4 per cent higher than a year ago according to the report for October issued by the Bureau of Mines. The ratio of production to capacity for October was 29.3 compared with 22.1 in October, 1933.

Steel—The operating rate of steel companies having 98.7 per cent of the steel capacity of the industry was 28.1 per cent of the capacity for the week beginning November 26, 1934, according to the American Iron and Steel Institute. This rate compares with 27.6 per cent one week ago, 25.0 per cent one month ago, and 26.8 per cent one year ago. The average operating rate for November was 1.2 points higher than for November, 1933.

Shipments of fabricated structural steel for October were the largest for any month this year, according to reports received by the American Institute of Steel Construction, being 62 per cent larger than the monthly average during the first half of the year and 38 per cent larger than for the same month last year. Bookings, however, were 28 per cent below the average for the previous 9 months, but approximately equal to the bookings during the same month in 1933. Tonnage ahead is about 11 per cent below the backlog this time last year.

Lumber—A preliminary report on lumber manufacture in the United States in 1933, issued by the Bureau of Census, estimates the total U. S. production of lumber in that year at 13,960,057,000 feet. This is an increase of 37½ per cent over the 1932 output. It compares with 38,000,000,000 in 1925, the high, and 10,000,000,000 in 1932 (the record low since 1869). The probabilities are that the 1934 production will be between 16,000,000,000 and 16,500,000,000 feet, according to the National Lumber Manufacturers Association. New business booked at lumber mills was heavier during the first and fourth weeks of November. The second week, however, was 6 per cent below the preceding 4 weeks and the third week was below the lowest week in the last three months. Production was lower during November than for any week since July, while shipments were low for the first three weeks but increased in the fourth week to above the average for the preceding six weeks. Shipments in November exceeded 177,000,000 feet per week.

Labor

Employment in the production of six major construction materials for October 1934 was 41.3 compared with September 1934, 41.5 and October 1933, 41.8 based on 1923-25 equals 100 according to the Federal Employment Stabilization Office. Adjusted for seasonal trends these index values are October 1934, 40.6, September 1934, 40.2, and October 1933, 41.0.

Employment on public and private building construction projects not aided by Public Works Administration funds increased 1.8 per cent in September, according to returns made by 10,939 firms reporting to the Bureau of Labor Statistics. During the month ending September 15, 1934, there were 550,000 employees working at the site of Public Works Administration construction projects. This total compared with 602,000 employees reported at work in August. Of the 550,000 employees in September, 390,428 were at work on federal projects and 127,161 on non-federal projects financed from the PWA fund. In New York State, although 626 more workers were employed by contractors in September than in August, payrolls dropped 1 per cent and man-hours 3 per cent. Increases in employment amounted to 0.9 per cent for general building contracting, 1.3 per cent for highway contracting, 2.9 per cent for miscellaneous general contracting and 3.2 per cent for sub-contracting, according to the Department of Labor, State of New York.

Few labor controversies are reported this month. At Rochester the Laborers' Union demands a closed shop. Original demands included a 5-day week, an 8-hour day making a 40-hour week, and an 80c. per hour wage rate. The Mason Contractors' Association will not grant this wage rate and points out that PWA rules require only a maximum working week of 30 hours to be enforced. As to the closed shop the contractors hold this is in violation of Article 7A of the National Recovery Act. Negotiations are being continued.

In New York City, an agreement between Electrical Workers Union, Local 13, and the Electrical Contractors Association provides for a 7-hour day at 8 hours' pay. The Building Trades Council, representing 84 crafts, held a meeting on November 20 and voted to abide by and extend the existing agreements to April 30, 1935, which had expired December 1, 1933, and had been maintained on a month-to-month basis.

At Dallas, general approval of wage and hour provisions of a proposed regional agreement covering the plastering and lathing division of the construction code was voiced by Dallas contractors and workers at a hearing held under the NRA. Terms of the agreement are expected to provide $1 an hour for plasterers and model makers, $1.50 for modelers and 90c. for casters.

In San Francisco, the proposed painters' code tentatively provides $7 for a 7-hour day, which is being paid with few exceptions. About 150 painters were on technical strike on account of these exceptions.

At Philadelphia, "kickback racket" charges involving the high speed line of the Delaware River Bridge, the new Naval Hospital, two projects within the Navy Yard and two at Fort Mifflin have been placed before the Federal September Grand Jury by U. S. District Judge George A. Welsh with instructions to sift evidence of large-scale chiseling of workmen's wages on government projects.

EN-R Cost and Volume Index

The *Engineering News-Record* Construction Cost Index for November is 201.86. This slight increase is due to an increase in the common labor wage rate average. The same situation on lumber prices exists as that reported September 6.

INDEX NUMBER

E.N.-R.-Cost	1913 = 100	1926 = 100	E.N.-R.-Volume	1913 = 100	1926 = 100
Dec., 1934	**201.86**	**97.63**	**Nov., 1934**	**115**	**50**
Nov., 1934	201.36	96.76	Oct., 1934	98	44
Dec., 1933	192.14	92.36	Nov., 1933	133	58
1933 (Av.)	170.18	81.80	1933 (Av.)	102	45
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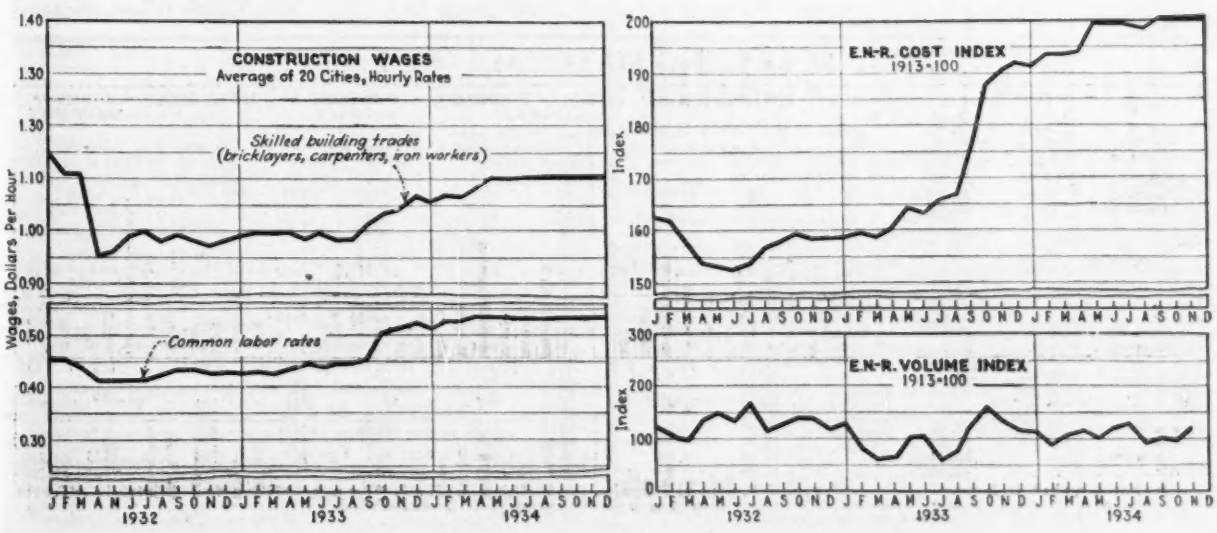

CURRENT PRICES OF CONSTRUCTION MATERIALS

CEMENT, AGGREGATES AND READY-MIXED CONCRETE—F.O.B. CITY

	PORTLAND CEMENT: Per bbl., carload lots, including 40c. per bbl. for bags, cash discount not included			SAND AND GRAVEL: Per ton, carload lots			CRUSHED STONE: Per ton, carload lots		CRUSHED SLAG: Per ton, carload lots, f.o.b. plant		CONCRETE: Ready Mixed 1:2:4, 50c.y. or more, delivered
	Cloth Bags*	Paper Bags	Bulk	Gravel, 1½ in.	Gravel, ¾ in.	Sand	1½ in.	¾ in.	1½ in.	¾ in.	
Atlanta	$2.79	$2.54	$2.34	$2.31	$2.31	$1.64	$1.69	$1.92	$1.80	$1.80	$9.00
Baltimore	2.66	2.41	2.21	1.80‡	2.00‡	1.25‡	1.80‡	1.80‡	2.25	2.25	7.35
Birmingham	2.55	2.30	2.10	1.75	1.75	1.40	.85	.85	.90	1.15	5.45
Boston	2.72	2.47	2.27	1.60	1.60	1.15	1.60	1.60	.....	.....	7.00
Chicago	2.85‡t	2.60‡t	2.40	2.60‡t	2.60‡t	2.05‡t	2.60‡t	2.60‡t	.....	.....	.....
Cincinnati	2.57	2.32	2.12	1.20	1.20	1.10	1.80	1.80	.....	.....	6.70
Cleveland	2.45	2.20	.....	1.55	1.55	1.45	1.60	1.60	1.75	1.75	8.85
Dallas	2.45	2.20	2.00	1.55	1.55	1.10	2.00	2.25	.....	.....	6.50
Denver	2.98‡	.....	.....	1.85	.....	1.25	.....	.....	.....	.....	.....
Detroit	2.25	2.00	1.80	1.15	1.05	1.00	1.10	1.10	1.30‡	1.30‡	6.00
Kansas City	2.45	2.20	2.00	.75p	.75p	.65p	1.25p	1.25p	.....	.....	7.00
Los Angeles	2.90	2.62	.....	1.90	1.90	1.40	1.90	1.90	.....	.....	6.70
Minneapolis	2.85	.....	2.40	1.00p	1.00p	.25p	1.00	1.00	.....	.....	6.90
Montreal	.....	1.70	.....	.....	1.50	1.40	.....	1.20	.....	.....	.....
New Orleans	2.47	2.22	.....	1.70	1.70	1.40	.....	.....	.....	.....	7.65
New York	2.65‡	2.40‡	.....	1.50†k	1.50†k	1.00†k	1.75†k	1.85†k	.....	.....	7.50
Philadelphia	2.60	2.35	.....	1.80‡	1.90‡	1.50‡	1.75‡	2.00‡	1.75‡	1.75‡	7.75
Pittsburgh	2.45	2.20	1.60	1.50‡	1.50‡	1.70‡	2.25‡	2.25‡	1.50	1.50	7.00
St. Louis	2.42	2.17	.....	1.25‡	1.25‡	1.25‡	1.71‡	1.71‡	.75§	.75§	6.50
San Francisco	2.72	2.52	2.20	1.35	1.35	1.35	1.50	1.50	.....	.....	7.53
Seattle	2.95	2.70	.....	1.50†	1.50†	1.50†	.....	.....	3.00	3.00	7.00

*10c. allowed for each returnable bag. †Per cu. yd. ‡Delivered. §F.o.b. Granite City, Ill. kBarge lots alongside dock. pf.o.b. plant. t5 tons or more.

CURRENT MAXIMUM NET PRICES RECEIVED AT CEMENT MILL

Charge for bags not included. For cloth bags, add 40c. per bbl.; 10c. refund allowed for each returnable bag; for paper bags add 15c. per bbl., not refundable.

	Bagged	Bulk		Bagged	Bulk		Bagged	Bulk
Alpena, Mich.	$1.65	$1.60	Ironton, Ohio	$1.60	$1.55	North Birmingham, Ala.	$1.75	$1.70
Buffington, Ind.	1.60	1.55	Iola, Kans.	1.70	1.65	Richard City, Tenn.	1.85	1.80
Crestmore, Calif.	1.72	.....	La Salle, Ill.	1.60	1.55	Saginaw, Mich.	1.65	1.60
Dallas, Tex. (Inc. 5c. tax)	1.80	1.75	Limedale, Ind.	1.60	1.55	Steelton, Minn.	1.80	1.75
Hannibal, Mo.	1.60	1.55	Mason City, Ia.	1.70	1.65	Universal, Pa.	1.65	1.60
Hudson, N. Y.	1.75	1.70	Norfolk, Va.	1.76	1.71	Waco, Tex. (Inc. 5c. Tax)	1.80	1.75
Independence, Kans.	1.70	1.65	Northampton, Pa.	1.65	1.60	Wyandotte, Mich.	1.60	1.55

Cash Discounts, Cement, to Contractors: truck delivery, 2% for cash on 10th of month; on carload deliveries, no trucking, same as dealer cash discount, 10c. per bbl. for payment within 15 days of date of invoice.

STRUCTURAL CLAY BUILDING TILE, BRICK AND LIME—DELIVERED

	STRUCTURAL CLAY TILE—PARTITION—SCORED: Per M, lots of 2,000 pieces or over,			STRUCTURAL CLAY TILE—LOAD BEARING—SCORED: Per M, lots of 2,000 pieces or over,			BRICK: Per M, in quantity,		LIME: Per ton,	in paper,	carload lot
	3x12x12 in.	4x12x12 in.	8x12x12 in.	8x12x12 in.	10x12x12 in.	12x12x12 in.	Common backing	Straight hard	Hydrated finishing	Common hydrated	Pulverized or lump
Atlanta	$84.27	$89.87	$168.40	$189.50	$243.20	$277.90	$13.22	$13.50	$17.50	$12.10	$12.10
Baltimore	77.50	82.50	154.00	185.00	216.00	267.00	13.00	17.00	16.50	11.00	19.00
Birmingham	84.25	90.00	156.00	180.00	215.00	242.00	15.00	22.50	3.00§	1.75§	2.25§*
Boston	85.30	91.15	171.00	193.50	239.60	273.40	14.50	17.00	18.75	13.75	3.26q*
Chicago	66.00	70.40	132.00	.....	.....	.....	10.20	11.20	18.00	13.40	14.00
Cincinnati	69.95	74.65	139.90	139.90	174.65	199.20	17.50	17.50	15.97	12.48	.....
Cleveland	62.50	66.50	124.50	149.50	188.00	214.75	16.50	16.50	17.20k	14.50k	2.65kp*
Dallas	74.75	80.00	156.50	196.50	240.80	297.00	13.50	28.00	18.20	14.50	1.70 p*
Denver	78.50	88.00	141.50	166.50	196.00	225.00	11.50–15.50	21.00–30.00	23.27	16.22	.....
Detroit	63.60	67.80	127.10	230.00	270.00	330.00	11.50	12.50	16.50	14.00	21.06
Kansas City	72.50	75.50	92.00	164.00	168.00	199.00	14.00	23.00	.55‡e	.52‡e	2.35§
Los Angeles	77.50	94.25	134.00*	188.00	232.50	311.50	11.50	14.00	18.70	.....	19.70
Minneapolis	78.25s	84.00s	143.00s	165.00s	173.00s	240.00s	13.10	15.10x	25.50	21.00	21.00
Montreal	.....	100.00s	.....	.....	240.00s	.....	14.75	21.50	22.00	12.75	.....
New Orleans	61.60	65.70	123.20	158.90	196.70	.....	14.50	.....	16.60	12.95	.....
New York	84.00	90.00	135.00*	193.30†	238.80†	295.60†	12.50	.....	20.80	16.00	20.80
Philadelphia	80.50	85.90	161.00	182.50	235.00	272.00	15.00	18.00	16.35	11.25	10.75
Pittsburgh	72.65c	77.45c	145.00c	165.00c	217.00c	250.00c	17.50	22.00	14.70	15.10	16.70
St. Louis	62.00	65.00	120.00	165.00	187.00	214.00	15.00	18.00	.48‡	.38‡	2.80p
San Francisco	84.00	94.50	225.00	.....	.....	.....	15.00	18.00	22.50	21.50	2.05p
Seattle	84.00	95.00	180.00	.....	.....	.....	15.50d	15.50	30.00	25.00	3.00p

*6x12x12 in. †F.o.b. Perth Amboy, N. J. ‡Per sack. §Per bbl., 200 lbs. pPer bbl. 180 lbs. qper bbl. 280-lb. kLCL. cLess 5% cash 15 days. dless $1 cash 15 days. tlump. sSmooth. xSelected common.

ROAD SURFACING MATERIALS—F.O.B. CITY

	PAVING BRICK AND BLOCKS: Granite per M, lots of 50,000, 4x4x8 in.,	Brick per M, 3x8½x4 in., carload lots	Wood per sq.yd., 3½ in., 16-lb. treat,	PAVING ASPHALT: Per ton, less than 80 penetration, Tank car	Drums	ASPHALT BINDERS—FLUXES: Per gal., 80-300 penetration, Tank car	Drums	CUTBACK ASPHALT: Per ton, Tank car	Drums	ROAD OILS: Per gal., Tank car	ASPHALT EMULSION: Per gal., Tank car	Drum
Atlanta	$ 80.00	$35.00	$2.25	$17.40z	$22.47z	$0.0694z	$0.961z	$19.65z	$25.57z	$0.0694z	$0.105	$0.105
Baltimore	125.00	44.00	2.25	17.00	22.00	.07	.095	.085†	.12†	.....	.....	.....
Birmingham	125.00	24.00	.....	18.00	23.00	0.778	.1028	.082†	.112†	.....	.06	.....
Boston	90.00	33.00	2.50	16.00	21.00	.075	.10	.095†	.13†	.075	.09	.125
Chicago	138.00	42.00	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Cincinnati	100.00	37.00	.....	18.00	22.00	.09	.....	18.50	.....	.07	.08	.....
Cleveland	100.00‡	32.75	2.95	20.00	24.50	.075	.09	.075†	.049†	.06	.085	.10
Dallas	.....	30.50	.....	15.40	21.10	.0585	.1090	16.40	22.60	.0528	.1076	.1438
Detroit	.....	37.00	.....	19.67z	24.67z	.....	.....	17.00	22.50	.....	.....	.....
Kansas City	.....	26.00	2.75	13.70	18.70	13.55#	18.55#	.0603†	.0853†	.03	.11	.16
Los Angeles	.....	48.50	.....	10.34	14.50	10.34#	14.50#	10.34	.....	.042	.06	.12
Minneapolis	.....	.....	2.50	18.10	24.00	.098	.098	21.75	34.55	.048	.....	.....
Montreal	.....	110.00	.....	14.00	19.66	.07	.093	19.09	26.50	.07	.125	.155
New Orleans	100.00	35.00	.....	14.50	18.50	.065	.09	.07†	.10†	.....	.....	.....
New York	137.50§	50.00	2.64	17.00	22.00	.07	.095	.085†	.12†	.....	.085	.12
Philadelphia	120.00	45.00	2.25	15.00	20.00	.06	.....	.07†	.10†	.06	.....	.....
Pittsburgh	115.00	40.00	.....	19.50	24.00	.0775	.1125	.086†	.121†	.0675	.....	.....
St. Louis	105.00	35.00	2.00	19.50	24.50	.078	.108	.088†	.118†	.04	.09	.125§
San Francisco	.....	50.00	.....	12.00	18.00	12.00#	18.00#	12.50#	23.00#	.04	.0575	.117
Seattle	.....	47.50	.....	18.00	23.85	18.00#	23.10#	15.00	.....	.03	.1923#	34.20#

Note: Paving asphalt, tank car or boat, f.o.b. Maurer, N. J., per ton, Bermudes, $25.00; Trinidad, $21.00. *Per sq. yd. †Per gallon. ‡4½x6x5½in. #Per ton §4x5x9-in. Av. zMexican. tlocal reduction due to 20% reduction intra-state class freight rates only, Georgia affected.

CURRENT PRICES OF CONSTRUCTION MATERIALS

IRON AND STEEL PRODUCTS—BASE MILL PRICES

	STRUCT. SHAPES-PLATE	REINF. BARS	RIVETS	WIRE NAILS	SHEET PILING	STEEL RAILS (Per Gross Ton)			TRACK SUPPLIES			
		½-in. billet, base price	½-in. structural	Base	Base	Standard	Light	Re-rolled	Angle bars	Std. spikes	Tie plates	Track bolts
Birmingham	$1.95	$2.10	.....	.....	.....	$36.375	.....	.....	$2.55	$2.40	$1.90	$3.55
Chicago	1.85	2.10	$3.00	.....	$2.25	36.375	$35.00	$34.00	2.55	2.40	1.90	3.55
Pittsburgh	1.80	2.05	2.90	$2.60	2.15	36.375	35.00	34.00	2.55	2.40	1.90	3.55

IRON AND STEEL PRODUCTS—BASE MILL PRICES, PER 100 LB., CARLOAD LOTS

F.O.B. WAREHOUSE	STRUCTURAL SHAPES Per 100 lb., base price	REINFORCING BARS Per 100 lb., ½ in., base price		EXPANDED METAL LATH —Per 100 sq yd., carload lots—		WELDED FABRIC REINFORCING —Per 100 s.f., carload lots—			SHEET PILING
		New billet	Rail steel	Std. diamond mesh, 3.4 lb	Std. ribbed 3.4 lb.	4x16 in., No. 5 & 10 wires	4x12 in., No 8 & 12 wires	6x6 in., No 6 & 6 wires Per sq yd	Per 100 lb base price
Atlanta	$3.63	$2.48	$2.33	$21.00	$24.00	$1.53	$1.16	$0.1449	$2.65
Baltimore	2.90	2.75	2.60	22.00	25.00	1.43	1.08	.1332	2.75
Boston	3.52	3.03	2.2125	20.00	24.00	1.46	1.12	.1449	2.30
Chicago	3.20	2.10	1.95	22.00	26.00	1.40	1.08	.1323	2.25
Cincinnati	3.40	3.25	3.25	25.01	29.50	1.39	1.07	.1287	.....
Cleveland	3.16	2.60	2.45	20.00	23.00	1.37	1.06	.1287	.....
Dallas	4.00	3.28	3.16	24.50	26.50	1.63	1.23	.1548	2.985
Denver	3.92	3.66	.....	24.50	30.50	1.68	1.26	.1548	.....
Detroit	3.40	2.885	2.885	24.75†	30.00†	1.41	1.08	.1323	2.25
Kansas City	2.78	2.85	2.65	20.50	22.50	1.50	1.14	.1422	2.65
Los Angeles	3.10	2.95	.....	23.00	27.50	1.68	1.26	.1584	2.50
Minneapolis	3.45	2.82	2.67	22.00	26.00	1.51	1.15	.1431	2.55§
Montreal	3.50	3.00	2.75	.....	.....	.....	.....	.....	3.20
New Orleans	.....	.....	.....	19.15	23.00	1.54	1.17	.1458	.....
New York	3.37	2.82	2.67	20.00	22.00	1.43	1.10	.1350	2.48
Philadelphia	2.005	2.34	2.19	20.00	23.50	1.42	1.09	.1332	2.44
Pittsburgh	1.80‡	2.05‡	1.90‡	20.75†	23.00‡	1.34	1.04	.1260	2.15
St. Louis	3.44	2.94	2.79	20.00	22.00	1.42	1.09	.1341	2.25
San Francisco	3.55	2.475	2.35	23.00	28.00	1.68	1.26	.1584	2.60
Seattle	3.55	3.50	.....	.....	.....	1.68	1.26	.1584	.....

‡Base Mill Price. Note: Shapes, bars and piling subject to quantity discounts. §Mill Price plus freight to Minneapolis. †f.o.b. delivered.

PAINTING AND ROOFING SUPPLIES—F.O.B.

	WHITE LEAD Per 100 lb. keg in oil	READY-MIXED PAINT Per gal., drums			ROOFING SUPPLIES Carload lots, f.o.b. factory				
		Graphite*	Aluminum†	Ferric Oxide‡	Rolls, slate surfaced, 85-90 lb., per sq	Asphalt felt, per 100 lb	Tar felt, per 100 lb.	Asphalt coating, per gal	Tar pitch, 350-lb. bbl., per ton
Atlanta	$11.50	$1.60	$3.10	.....	$1.99	$1.97	$2.90	¶ .36	$25.40
Baltimore	11.00	1.40	2.25	$1.90	2.52	2.48	2.48	.455	23.00
Birmingham	11.50	2.35	2.35	1.85	1.95	1.79	.....	.36	23.00
Boston	10.25	1.75	2.60	.04½x	2.15	3.25	3.25	.46	20.00
Chicago	11.00	1.85	2.45	1.30	1.60	1.59▫	1.59▫	.24	20.00
Cincinnati	11.00	1.40	3.00	1.55	2.40	2.39▫	2.39▫	.36	21.00
Cleveland	11.00	1.65	2.35	1.30	1.60	2.45▪	2.45▪	.24	22.00
Dallas	12.00	1.80	2.24	.....	3.15	2.56½	2.56½	.43	30.25▾
Denver	11.75	2.55	.....	.....	2.17	3.00	3.00	.50	30.00
Detroit	9.90	1.35	2.20	1.30	1.75	2.35	2.50	.37	27.00
Kansas City	11.12½	1.85	2.25	1.65	1.75	1.85	2.15	.33	26.75
Los Angeles	10.00	1.60	2.25	2.30	2.00	1.50	.....	.45	.....
Minneapolis	11.12½	.....	.....	.....	1.60	1.79▪	1.79▪	.29	25.10
Montreal	9.40	1.70	3.45	1.65	2.00	2.62	2.02	1.40§	1.52§
New York	11.00	1.70	2.35	1.48	1.60	1.79▪	1.79▪	.232	22.00
Philadelphia	9.93	1.50	2.05	1.50	1.68	1.85▪	1.85▪	.34	22.00
Pittsburgh	11.00	1.05	1.95	.80	1.75	1.65▪	1.65	.38	22.00
St. Louis	11.00	1.85	2.45	1.30	1.60▫	2.75	2.75	.24	20.00
San Francisco	10.75	1.80	2.75	1.10–2.00	1.89	3.10	3.10	.38	26.00
Seattle	10.75	.....	1.92	.....	3.10	4.50	.....	.50	27.60

*U. S. War Dept. Spec. 3-49A. †ASTM Spec. D266-31. ‡80% maximum ferric oxide. §Per 100 lb. ▪Per roll, 65 lb. xPer lb. ▾500-lb. drums.
Note: Red lead dry, same as white lead in oil, red lead in oil 50c higher.

MISCELLANEOUS ITEMS

WINDOW GLASS

Discounts from latest jobbers list, Sept. 15, 1928

	Single or Double Thickness A quality	B quality
Atlanta	85%	85%
Baltimore	90%	92½%
Birmingham	88%	90%
Boston	88–10–5%	90–10–5%
Chicago	90%	92%
Cincinnati	87@10%	89@10%
Cleveland	89-10 10%	91-10 10%
Dallas	88%	92%
Denver	86%	88%
Detroit	87@10%	89@10%
Kansas City	90@10%	90@10%
Los Angeles	90%*	90@10%
Minneapolis	87%	89%
Montreal	.....	.....
New Orleans	88%	90%
New York	89%	91%
Philadelphia	88@30%	90@30%
Pittsburgh	88%	88%
St. Louis	90%	92%
San Francisco	90%	90@30%
Seattle	90@10%	90@20%

*Disc. from list Aug. 1, 1929. †F.o.b. Arsenal.

EXPLOSIVES

Per lb. dynamite delivered 50-lb. cases

	Gelatin 40%	60%
Atlanta	$0.215	$0.2375
Baltimore	.15	.165
Birmingham	.105	.120
Boston	.17	.16
Chicago	.....	.....
Cincinnati	.27	.29
Cleveland	.19	.205
Dallas	.17	.185
Denver	.1525	.1675
Detroit	.237	.255
Kansas City	.14	.18
Los Angeles	.1725†	.1925†
Minneapolis	.17	.185
Montreal	.1925	.2175
New Orleans	.19	.22
New York	.22	.235
Philadelphia	.....	.....
Pittsburgh	.105	.12
St. Louis	.13	.145
San Francisco	.1575	.1775
Seattle	.1425	.1575

CHEMICALS

Water, sewage treatment, road work, f.o.b., carlots, New York:	
Bleaching powder, in drums, f.o.b. works, per 100 lb.	$2.25
Calcium chloride, 77-80%, flaked, in 400-lb. drums or 100-lb. moisture proof bags, f.o.b. works, freight equalized with points of competition, per ton	19.50
Chlorine, cylinders, per lb. delivered	.05½
Silicate of soda, 52 deg., in drums, f.o.b. works, per 100 lb.	1.35
Soda ash, 58%, in paper bags, per 100 lb.	1.20
Sulphate of aluminum, commercial, in 100 lb. bags per ton	27.60
Sulphate of copper, in bbl., per 100 lb.	3.85

PILES

Prices per linear foot, pine, with bark on f.o.b., New York; delivered from barge, 1½ to 2c. per ft. additional:

Dimensions	Points	Length	Short Leaf Barge	Short Leaf Rail	Long Leaf Barge	Long Leaf Rail
12 in. at butt	6 in.	30 to 50 ft.	$0.11	$0.155	$0.12	$0.15½
12 in.—2 ft. from butt	6 in.	50 to 59 ft.	.15	.20	.14	.19
12 in.—2 ft. from butt	6 in.	60 to 69 ft.	.16	.215	.15	.20½
14 in.—2 ft. from butt	6 in.	50 to 69 ft.	.185	.225	.19½	.23½
14 in.—2 ft. from butt	6 in.	70 to 79 ft.	.2025	.225	.23½	.29½
14 in.—2 ft. from butt	5 in.	80 to 85 ft.	.265	.375	.....	.....
14 in.—2 ft. from butt	5 in.	85 to 89 ft.	.305	.442	.....	.....

RAILWAY TIES

Prices f.o.b., per tie, for carload lots:

		6 In. x 8 In. by 8 Ft.	7 In. x 9 In. by 8½ Ft.
Boston	Oak, untreated	$0.95	$1.35
	Pine, untreated	1.00	1.40
	Pine, creosoted	1.45	2.00
New York	Long-leaf sap pine, untreated	.80	1.00
	Mixed oak, untreated	.....	1.00
	White oak, untreated	.75	1.50
Birmingham	White oak, creosoted	no market	
	Southern pine, untreated *6x8x8'6"	.45*	.60
	Southern pine, creosoted	1.00*	1.20
Chicago	White oak, untreated	1.15	1.40
	Oak, empty cell, creosoted	1.50	1.88
	Oak, sine treated	1.40	1.70
	Southern pine, creosoted	1.35	1.78
Los Angeles	Fir, untreated	.50	.72
	Fir, creosoted	1.67	2.40
Philadelphia	Red oak, untreated	1.15	1.35
	Red oak, creosoted	1.40	1.65
St. Louis	White oak, untreated	1.00	1.45
	Red oak, untreated	.98	1.40
	Red oak, creosoted	1.35	1.90
San Francisco	Sap Pine or cypress, untreated	.78	1.25
	Douglas fir, green, untreated	.45	.63
	Douglas fir, empty cell, creosoted	1.14	1.56
Montreal	Birch or maple, untreated	1.10	1.10
	Birch or maple, creosoted	1.25	1.55

CURRENT PRICES OF CONSTRUCTION MATERIALS

WATER, SEWER AND DRAIN PIPE

	C. I. PIPE	VITRIFIED SEWER PIPE				CLAY DRAIN TILE		CONCRETE SEWER PIPE		WROUGHT STEEL PIPE			
	Per net ton, f.o.b. 6 in. and over*	Per foot, delivered, standard (‡ f.o.b.) 8 in., s.s.	12 in., s.s.	24 in., d.s.	36 in., d.s.	Per 1,000 ft., carload lots, f.o.b. 6 in.	8 in.	Per ft., delivered; ASTM C 14-24 12 in.	24 in.	Full standard weight. # 1 to 3 in., Black	Butt Weld Galv.	3½ to 6 in., Lap Weld Black	Galv.
Atlanta	$42.00	$0.225	$0.405	$1.4625	$3.25	$80.00	$128.00	$0.55	$1.60	44%	37%	42%	34%
Baltimore	45.50	.24	.46	2.10	6.12	105.00	160.00	.75	2.00				
Birmingham	38.00	.25	.45	1.625	4.660	85.00	.....	.45	1.60	48.939%	37.918%	50.162%†	39.143%†
Boston	45.50	.231	.4455	2.025	5.945	60.10	101.00	.54	2.00				
Chicago	46.50	.28	.54	1.98	5.60	85.00	120.00	.675	2.25	56%	45%	55%	57%
Cincinnati	45.00	.294	.432	1.89	5.74	64.29	.....	.40	1.40	53.04%	42.02%	54.265%	43.245%
Cleveland	46.50	.21	.405	1.755	5.2275	47.25	72.60	.536	2.102	58.4%	48.4%	60.6%	49.6%
Dallas	50.00	.27	.486	1.944	.....	120.00	150.00	.46	1.52	64%	55%	65%	56%
Denver	58.00	.23‡	.415‡	1.73‡	.....	.....	.....	.....	.....	56%	45%	43%‡	57%‡
Detroit	46.50	.28	.54	2.25	6.15	73.25	122.65	.36	1.575	48.6%	38.2%	47.3%	37.6%
Kansas City	48.00	.32	.57	2.27	4.90	.....	.....	.....	.....	.....	.....	.....	.....
Los Angeles	46.50	.2825‡	.508‡	2.03‡	5.535‡	115.50	192.50	1.00	2.00	53.57%	43%	53%	42.51%
Minneapolis	48.50	.283	.51	2.04	5.13	.....	.....	.50	1.33	.....	.....	.....	.....
Montreal	.....	.....	1.10	3.70	.....	.....	.....	.....	.....	.....	.....	.....	.....
New Orleans	44.00	.275	.462	1.62	.....	50.00	.....	.51	1.69	.....	.....	.....	.....
New York	45.00	.322	.621	2.73	7.60	.....	.....	.55	2.00	51.88%*	40.86%*	53.10%†*	42.08%†*
Philadelphia	42.00	.315	.6075	2.70	.....	150.00	230.00	.....	.....	52.37%*	41.35%*	53.39%†*	42.57%†*
Pittsburgh	48.00	.224‡	.432‡	1.845‡	5.535‡	69.00	108.00	.75	1.75	64%	55%	65%†	56%†
St. Louis	45.00	.27	.486	1.944	3.96	85.00	172.00	.80	2.28	51.51%	40.49%	52.74%	41.71%
San Francisco	46.00	.265	.477	1.908	5.22	105.00	175.00	.....	2.20	52.4%	63.4%	51.1%	64.6%
Seattle	47.50	.35	.63	2.52	.....	85.00	200.00	1.50	1.60	60.3%	51.3%	65.3%	52.3%

*b. & s. class B and heavier, C/L lots. Burlington, N. J. (base) $42.00. Gas pipe and class A, $3 per ton additional, 4-in., $3 per ton additional.

#Discounts from standard list for delivery from warehouse, except Pittsburgh prices are f.o.b. mill. Base price $200 per net ton. List prices per ft.: ¼ in., 8½c; ⅜ in. 11½c.; 1 in., 17c.; 2 in., 37c.; 2½ in., 58½c.; 3 in., 76½c.; 4 in., $1.09; 6 in., $1.92. †3½ to 6 in., ‡2½ to 3 in. ^Resale price to consumer, car load lots shipped from mill.

LUMBER AND TIMBER

		SHORT LEAF YELLOW PINE AND DOUGLAS FIR — Per M ft. b.m., carload lots f.o.b. All Fir planks No. 2 common; Fir timber is No. 1 common. All S. L. Y. P. is No. 2 common or better and for No. 1 N. C. Box. Lengths up to 20 ft.								LONG LEAF Y. P. — Per M ft. b.m., C/L lots, f.o.b., merchantable grade up to 20 ft	
		1x6, S4S	1x8, S4S	2x4, S4S	2x6, S4S	2x8, S4S	2x10 S4S	3x12 Rgh	6x12 Rgh.	12x12, Rgh.	2x12 Rgh.	12x12, Rgh.
Atlanta	Southern Pine	$18.00	$19.00	$21.00	$18.50	$20.00	$20.50	$28.00	.....	.....	$38.50	$40.00
Baltimore	Southern Pine	25.00	26.00	31.50	29.50	30.50	33.00	38.00	.....	.....	54.00	55.00
	Douglas Fir	29.00	29.00	31.00	29.00	30.00	32.50	30.00	$30.00	$30.00		
Birmingham	Long Leaf	18.25	19.25	21.25	19.25	20.25	20.25	42.00	.....	.....	32.00	39.80
	Southern Pine	18.25	19.25	20.00	18.00	19.00	19.00	29.00	29.00	28.00	.....	.....
Boston	Southern Pine	33.00	35.00	40.00†	41.00†	58.00‡	67.00‡	77.00‡	.....	.....	77.00	77.00
	Douglas Fir	31.25	33.50	40.50	40.25	40.75	41.00	44.00	44.00	44.00		
Chicago	Southern Pine	27.00	28.40	33.50	30.00	31.00	32.50	45.00	.....	.....	54.00	58.00
	Douglas Fir	28.50	29.50	31.75	30.50	30.50	28.50	40.75	41.75	41.75	.....	.....
Cincinnati	Southern Pine	26.00	27.00	27.50	25.50	26.50	27.50	43.50	.....	.....	43.50	.....
	Douglas Fir	.....	.....	.....	.....	.....	.....	46.25	46.25	46.25	.....	.....
Cleveland	Southern Pine	28.50	29.50	31.00	28.00	30.25	30.50	45.00	45.00	.....	46.00	57.00§
Dallas	Southern Pine	26.25	27.00	29.02	26.27	27.92	28.72	42.44	.....	.....	47.55	55.55
	Douglas Fir	29.45	30.53	33.28	30.55	38.64	32.45	44.85	44.85	44.85	.....	.....
Denver	Douglas Fir	.....	34.50*=	38.50*	37.50*	37.50*	42.50*	48.00*	50.00*	55.50	.....	.....
Detroit	Southern Pine	26.00	27.50	30.00	27.00	30.00	32.00	37.00	.....	.....	32.00	43.75
	Douglas Fir	.....	.....	.....	.....	.....	.....	43.25	44.25	44.25	.....	.....
Los Angeles	Douglas Fir	27.00	28.50	28.50	25.00	25.50	25.50	35.00	38.00	34.00	.....	.....
Minneapolis	Western Pine	44.00*	41.25*	34.00*	31.50*	33.00*	31.50*	50.75*^	.....	.....	.....	.....
	Douglas Fir	33.25*	34.50*	36.00*	33.50*	35.00*	37.00*	47.00*	50.75*	50.75*	.....	.....
Montreal	Spruce	30.00	31.00	27.00	29.00	30.00	35.00	38.00	.....	.....	.....	.....
	Douglas Fir	42.50	42.50	42.50	44.00	44.00	45.75	51.00	51.00	51.00	42.00	.....
New Orleans	Southern Pine	27.50	28.45	33.20	28.15	30.75	31.95	43.95	.....	.....	45.65	52.75
	Douglas Fir	28.95	31.50	33.90	28.75	32.65	33.95	37.95	.....	.....	.....	.....
New York	Southern Pine	32.00*	33.50*	34.00*	32.50*	35.00*	36.50*	46.00*	.....	.....	74.00*	74.00*
	Douglas Fir	.....	.....	38.00*	37.00*	38.00*	39.00*	37.50*	39.00*	39.00*	.....	.....
Philadelphia	Southern Pine	24.50	25.50	27.00	25.50	26.50	27.00	31.00	.....	.....	61.00	59.00
	Douglas Fir	.....	.....	31.00	31.00	31.00	31.00	32.50	32.50	33.50	.....	.....
Pittsburgh	Southern Pine	26.50	27.75	32.75	29.25	31.75	32.75	41.50	.....	.....	57.50	57.50
	Douglas Fir	33.50	34.50	34.50	33.50	34.00	34.25	46.25	46.25	46.25	.....	.....
St. Louis	Southern Pine	32.25*	33.75*	35.25*	32.25*	33.75*	33.75*	55.25*	.....	.....	49.00*	71.00*
	Douglas Fir	.....	.....	.....	.....	.....	.....	54.25*	54.25*	54.25*	.....	.....
San Francisco	Douglas Fir	15.00/	16.00/	17.00/	14.50/	15.50/	16.50/	21.00/	21.00/	21.00/	.....	.....
Seattle	Douglas Fir	22.50	21.50	21.50	21.00	22.50	22.50	20.00	20.00	22.00	.....	.....

*Delivered. †Spruce. ‡Long-leafed Y. P. §Norway Pine. ^Northern Pine. /Douglas fir. =Native. tAt ship's tackle.

CURRENT BUILDING AND CONSTRUCTION WAGE RATES PER HOUR

	Bricklayers	Carpenters	Structural Iron Workers	Hoisting Engineers	Plasterers	Common Labor — Building	Common Labor — Heavy Const.
Atlanta	$0.70/1.125	$0.40/.90	$0.60/1.25	$0.60/1.25	$0.60/1.00	$0.30/.40	$0.30/.40
Baltimore	1.25	1.10	1.37½	1.25	1.25	.45	.45
Birmingham	1.00	1.00	1.00	1.00	1.00	.30/.40†	.30/.40†
Boston	1.20	.70/1.17½	1.20	.90/1.37½	.90/1.37½	.40/.70	.40/.70
Cincinnati	1.27½	1.02½	1.20	1.07½	1.27½	.45	.40
Chicago	1.50	1.31¼	1.35	1.31¼	1.50	.82½	.82½
Cleveland	1.25	1.12½	1.25	1.25	1.25	.72	.72
Dallas	1.00	1.00	1.15	.75	1.00	.40	.40
Denver	.60/1.12½	.60/.87½	.60/.87½	.60/.87½	.....	50	.50
Detroit	1.25	1.00	1.25	.75/.95	1.25	50	.50/.70
Kansas City	1.32½	1.12½	1.25	1.12½	1.12	.50/.60	.60/.75
Los Angeles	1.10	1.10	1.25	1.10	1.25	.50	.60
Minneapolis	.90/1.20	.75	.90	.75	.90	.40	.50
New Orleans	1.00	.75	1.00	1.00	1.25	30./.40	.30/.40
New York	1.50	1.40	1.45/1.65	1.50/1.65	1.50	.82½	.82½/.93¾
Philadelphia	.75/1.20	.60/1.20	1.00/1.20	.75/1.20	.60/1.20	.30/50	.30/.50
Pittsburgh	.50/1.00	.50/1.00	.50/1.00	.50/1.00	.50/1.00	.35/.50	.35/.50
St. Louis	1.50	1.25	1.47	1.35/1.47	1.50	.78¾	.35/.78¾
San Francisco	1.50*	1.10	1.37½	1.12½	1.25*	.62½	.60
Seattle	1.25	1.12½	1.37½	1.25	1.50	.70	.70
Montreal	0.70	.60	.60	.55	.67	.35	.25

Skilled Avg: (Bricklayers, Carpenters, Ironworkers) $1.12. Common Avg. $0.5413 *6-hr. Day † PWA.

CONSTRUCTION REPORTS

WATERWORKS

PROPOSED WORK

Calif., Newport Beach—City, R. L. Patterson, engr., City Hall, recommended to City Council that city build water plant on 34 acre site at Fairview Ave. and Hunsaker Blvd., to involve immediate drilling of test well, drilling 3 wells and constructing necessary pipe lines and alternative plans is being considered, est. $62,000. Total est. $121,000.

Colo., Leadville—Twin Lakes Reservoir & Water Co., Ordway, tunnel for water diversion, R.F.C. investigation completed but recommendations not announced on application for $850,000 loan. Is supplementary to $1,250,000, RFC loan, financing first tunnel, now partly completed. Expect 2nd tunnel to be financed inasmuch as RFC advanced load for first one. Noted Oct. 18.

Florida — Gulf Water Co., St. Petersburg, plans elevated water tank and 15 mi. or more 6 and 8 in. mains, also pumping plant, various locations, Pinellas Co.

Ill., Joliet—City, bids early in 1935, water filtration plant, dam, impounding reservoir, purifying plant, 3 m.g. standpipe. $1,790,000. P.W.A. project. C. DeLeuw & Co., 20 North Wacker Dr., Chicago, engrs. Noted Aug. 16.

Ill., Monticello—City plans improving water supply. Warren & Van Praag, Decatur, engrs. Awaiting approval. H. F. Ferguson, ch. sanitary engr. State Dpt. P. Health, Div. Sanitary Engineering.

Ill., Mount Olive—City making plans waterworks improvements, incl. dam, pumps, tank on tower, reservoir, distribution mains. $115,000. Warren & Van Praag, Inc., Milliken Bldg., Decatur, engrs.

Ill., Union—City plans pump house and reservoir. Mead, Ward & Hunt, Madison, engrs. Awaiting approval H. F. Ferguson, ch. sanitary engr. State Dpt. P. Health, Div. Sanitary Engineering.

Ill., Westmont—Village bids late in December or January, constructing deep well, water system, 5,500 lin.ft. 6 in. c.i. mains, 12 hydrants, 6 gate valves, water service building. $60,000. C. DeLeuw Co., 20 North Wacker Dr., Chicago, engrs. Noted Feb. 1.

Kan., Onaga—City made plans dam and filter improvements at waterworks. $25,000. Awaiting approval of State Bd. of Health. C. A. Haskins, 517 Finance Bldg., Kansas City, Mo., engrs. Noted Mar. 29.

Ky., Louisville—City plans complete water metering of all users in accordance with State P. Utilities Comn. rules. $720,000. J. Chambers, 435 South 3rd St., engr.

Mich., Kalamazoo—City plans extending c.i. watermains and sewers; constructing sidewalks and streets in area where it is proposed to develop housing community in conjunction with FERA. $60,000. E. C. Rutz, city mgr.

Nev., Winnemucca—City voted $306,000 for municipal water and light system. P.W.A. project. Noted Sept. 7, 1933.

O., Massillon—City defeated $1,750,000 bonds for water plant. G. B. Gascoigne, Leader Bldg., Cleveland, engr. Noted Oct. 4.

Pa., North East—Village, special election Dec. 11, $35,000 for water supply system improvement, incl. dam 12 ft. high on Black Brook to flood area ¼ mi. by 10 ft. deep with 600,000,000 gal. capacity and constructing pipe line to connect with present system. H. F. Eaton, mayor and engr. is preparing plans.

Tex., Abernathy — Municipality soon takes bids waterworks, incl. 50,000 gal. elevated tank. To exceed $15,000. H. B. Roberts, Lubbock, engr.

Ont., Kirkland Lake—W. M. Bain, town clk., preparing plans and takes bids early in 1935, water system on Chaput-Hughes Townsite. $75,000. G. Broun, Kirkland Lake, engr.

Ont., Sault Ste. Marie—Utilities Comn., W. M. Cornell, mgr., plans linking up new artesian well in Korah Twp. with city water supply. $150,000. Report to be prepared.

BIDS ASKED

Ill., Bradford—Dec. 27, by Village Bd., J. C. Tumbleson, pres., Village Hall, constructing waterworks. $12,000. P.W.A. project. J. A. Harmon, Inc., 945 Jefferson Bldg., Peoria, engrs. Noted Jan. 4.

Ill., Bushnell—Dec. 27, by City, A. Brady, mayor, constructing waterworks. $16,500. P.W.A. project. W. Russler, Bushnell, engr. Noted Aug. 30.

Ill., Deland—Dec. 11, by Bd. Village Trustees, C. T. Heller, pres., waterworks. $38,000. P.W.A. project. Warren & Van Praag, Inc., 415-418 Milliken Bldg., Decatur, engrs.

Ill., Hartford—Dec. 12, by Village, C. Brown, pres. Bd. Trustees, constructing waterworks. $28,500. R. Horton, 650A East Big Bend Blvd., St. Louis, Mo., engrs. Noted Nov. 29.

Ind., Salem—Town Council taking bids waterworks plant, incl. pumping station, 3/5 mi. watermains on 350 acre site, near Indian Springs. $30,000. G. Shrumm, Salem, engr.

†**Mass., Boston**—Dec. 12, by P. Wks. Officer, Bldg. 39, Navy Yard, Boston, furnishing, erecting 35,000 gal. steel water tank on roof of building 149 and connecting tank to existing sprinkler system, Spec. 7841.

Mo., Miller—City bids about Dec. 21, waterworks and distribution system. $35,000. P.W.A. project. Ozark Eng. Co., Court House, Springfield, engr. Noted Nov. 22.

N. Y., Jordan—See "Contracts Awarded."

N. Y., Watervliet—Dec. 13, by City Council, City Hall, 10,000 ft. 24 in. c.i. supply main, 2 chlorinators, 1 ammoniator, 2 dry feed machines for alum and carbon, 2 agitators, and covering parts of sedimentation basins with gunite. P.W.A. project. Solomon & Keis, 257 Bway., Troy, consult. engrs.; adv. E.N.-R., Dec. 6.

Pa., Paden—Dec. 10, by G. A. Blazier, boro secy., 10,000 ft. 4 and 6 in. c.i. pipe with fittings, valves, etc., caulking material and 1 in. copper pipe. W. K. Blackford, secy. Water Comn.

R. I., Exeter—State bids about Dec. 10-15, water system, incl. 100,000 gal. elevated steel water tank, watermains, etc., for fire prevention at State School buildings. $30,000. P.W.A. project. Allen & Read, Inc., 178 Dorrance St., Providence, engrs. Noted Aug. 23.

Tex., Avery—Dec. 13 (extended date), by City, c/o W. M. Bryan, mayor, waterworks improvements, incl. storage, distribution system, well and elevated tank. $21,000. P.W.A. project. D. C. Walmsley, Thomas Bldg., Dallas, engrs. Noted Nov. 22.

Tex., Dodsonville—Dec. 14, by City, c/o N. H. Deahl, mayor, waterworks, distribution system and water wells. $52,000. P.W.A. project. A. P. Briggs, Childrss, engr. Noted July 20.

Tex., Freeport—Dec. 27, by Brazos River Harbor Navigation Dist., c/o E. C. Tobey, chn., Freeport, constructing watermains, fire protection system, incl. 100,000 gal. elevated steel tank, concrete reservoir, wells, pumps, etc., in connection with port terminal facilities. Noted Nov. 22, under "Earthwork, Irrigation, Drainage and Waterways."

Tex., Pecos — Dec. 14, by B. A. Toliver, mayor, waterworks system, incl. 2 wells, 3 pump houses, 3 derricks, 300 g.p.m. pumps, motors, two 500 gal. per min. pumps and motors, 11 mi. 11,500 volt transmission line, 1,000 lin.ft. 440 volt transmission line, 1,000 lin.ft. 440 volt transmission line, incl. service leads, 1 transformer substation, 57,300 lin.ft. 10 in., 7,400 lin.ft. 8 in., 22,000 lin.ft. 6 in., 700 lin.ft. 4 in. and 7,000 lin.ft. 2 in. c.i. pipe, 20,000 lb. c.i. fittings, 23 two in., 7 four in., 18 six in. gate valves, 16 new fire hydrants, one 10,000 gal. concrete control tank with valves, etc., one 200,000 gal. concrete reservoir with valves, etc., one 200,000 gal. steel storage reservoir with valves, etc., 1 brick and concrete pump station, 1,500 lin.ft. addl. ¾ in. copper pipe, 1,800 lin.ft. fence at 5 locations, 50 ¾x¾ in. cold water meters. $300,000. B. G. Warner, Pecos, project engr. H. R. F. Helland, 1020 Frost Bank Bldg., San Antonio, consult. engr. P.W.A. project. Noted Nov. 22.

Utah, Wellington—Dec. 14, by City Council, replacing wood mains with c.i. pipe, constructing concrete reservoir. P.W.A. project. $26,000. W. R. Wayman, Price, engr. Noted July 26.

Ont., Kenora—Jan. 10, (extended date), by Town Clerk, Kenora, furnishing, erecting in place 2 direct connected electric motor driven centrifugal pumping units for water supply system. W. M. Scott, Civic Office Bldg., Winnipeg, Man., consult. engr.

CONTRACTS AWARDED

Ala., Fairhope—Town Council, Town Hall, constructing water system, consisting of 225,000 gal. concrete reservoir, 75,000 gal. tank and tower service pump, fire pumps and 8 in. c.i. pipe and all valves, fittings and appliances, tank and tower, to Chicago Bridge & Iron Co., 1500 North 50th St., Birmingham, $7,420•••deep well, to Gray Artesian Well Co., Pensacola, Fla., $3,975•••balance of waterworks, to J. B. McCrary Co., 22 Morietta St. Bldg., Atlanta, Ga., $50,423. Grand total $61,818. P.W.A. Bids Nov. 16. Noted Nov. 8.

Colo., Leadville—Twin Lakes Reservoir & Water Co., Ordway, F. R. Smith, engr., furnishing screened sand, to Harris Constr. Co., Denver•••hauling screened sand to tunnel site for use in lining 6,000 lin.ft. tunnel and 1,250 ft. of gunite lining where concrete will have to be shot in with air, to Pantle Bros., Ordway. Part of $1,250,000 PWA job. Noted Aug. 3, 1933, under "Contracts Awarded."

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Federal Government projects are classified under heading denoting type of work and designated by symbol of †

◆

Colo., Manitou—City Council, installing 14,000 ft. c.i. pipe between town and reservoir on French Creek, to R. C. Whitlock, Colorado Springs, $12,644. **P.W.A.** Bids Oct. 23.

Conn., Willimantic—City, filtration plant, refacing dam, repairing reservoir Hosmer Mountain. Owner builds. $50,000. FERA project. N. S. Hill, Jr., 112 East 19th St., New York, engr., completing specifications for equipment, etc.

Ill., Colchester—City, 40,980 lin.ft. 4- to 8-in. c.i. pipe, 59 fire hydrants, 35 valves, 175 service connections, 1 master meter, 100,000 gal. on 100 ft. tower, brick pump house, one 100 g.p.m. turbine pump, one 100 g.p.m. Zeolite softener, one chlorinator, 600 ft. 8 in. vitr. sewer and 2 manholes, to C. M. Porter & Co., 111 West Washington St., Chicago, $61,123. Est. $76,500. **P.W.A.** Noted Nov. 1.

Ill., Griggsville — City, constructing waterworks, incl. porous concrete well, rein.-con. water storage chamber and complete pumping station, 6 and 8 in. c.i. force main, complete water distribution system, fittings, hydrants, service meters, 60,000 gal. steel tank on tower, to Pittsburgh-Des Moines Steel Co., 9th and Tuttle Sts., Des Moines, Ia., $67,869. **P.W.A.** Bids Nov. 8. Noted Nov. 1.

Ill., Saybrook—Village, 27,000 ft. 4- to 8-in. c.i. mains, 2 in. galvanized pipe, 40 fire hydrants, 60,000 gal. tank on tower, 100 services and meters, one 14x14 ft. brick pump house, one 10 in. well 60 ft. deep, 1 motor driven turbine type 100 g.p.m. pump, to Ostrom Realty & Constr. Co., 625 Peoples Bank Bldg., Indianapolis, Ind., $30,077. Est. $52,000. **P.W.A.** Bids Oct. 26. Noted Oct. 11.

Ky., Beattyville—Town Clerk, constructing complete waterworks system, to Codell Constr. Co., Winchester. **P.W.A.** J. S. Watkins, Lexington, engr.

Massachusetts—Commonwealth of Massachusetts, Metropolitan Dist., Water Supply Comn., 20 Somerset St., Boston, F. E. Winsor, ch. engr., constructing dike of Quabbin Reservoir in towns of Enfield and Ware, embankment to be 2,140 ft. long, 135 ft. high and requiring about 2¾ million cu.yd., about ¾ of which must be placed hydraulically; concrete caisson cut-off has been constructed to ledge across the valley bottom under previous contracts. Work includes placing and consolidating foundation embankment in preparation for hydraulic sluicing, placing concrete over and grouting ledge rock on 2 hillsides, placing rip rap on upstream and soil dressing on downstream faces, building roads and other appurtenant works, to Arthur A. Johnson Corp., 29-28 Hunter Ave., Long Island City, N. Y., $1,445,755. N. Le Roy, Hammond, div. engr. Bids Nov. 13, awarded Nov. 28. Noted Oct. 18.

Massachusetts—Salem-Beverly Water Bd., C. F. Coker, treas., Old Town Hall, Salem, gate valves for Salem-Beverly filtration plant, to Chapman Valve Mfg. Co., 71 A St., South Boston; sluice gates, to Cambridge Machine & Tool Co., 150 Medford St., Cambridge.

Massachusetts—Salem-Beverly Water Bd., C. G. F. Coker, treas., Old Town Hall, Salem, furnishing structural steel in connection with Salem-Beverly filtration plant construction, to A. O. Wilson, Structural Co., 40 Smith Pl., Cambridge•••gravel, to Essex Sand & Gravel Co., Pine St., Peabody•••granite, to John Harrington Co., 52 1st St., Cambridge•••mixing tank stirrers, to New England Tank & Tower Co., 85 Tileston St., Everett•••flow gages, filter operating table, etc., to Ruggles-Klingman Mfg. Co., 38 Chauncy St., Boston•••water rate con-

†*Federal Government.*

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FEBRUARY 7, 1935

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Waterworks (Continued)

trols, to Norwood Eng. Co., 234 Boylston St., Boston***miscellaneous iron, to Smith & Lovett Co., 135 Tyler St., Boston***sewer pipe, to Hume Pipe Co. of N. E., Inc., Danvers Rd., Swampscott***elevator, to F. S. Payne Co., 75 Richdale Ave., Cambridge.

†**Mass., Scituate**—Public Wks. Officer, Building 39, Navy Yard, Boston, 4 in. transite pipe water supply main from Humarock, Mass., to Naval Direction Finder Station, incl. valves, fittings, 1 fire hydrant. Spec. 7816. to W. W. Staples, 4 Cushman St., North Attleboro, $6,419. Bids Nov. 15, awarded Nov. 27. Noted Nov. 8.

N. Y., Bethlehem—Water Comrs., constructing reservoir for waterworks, Contr. 2, to A. C. Rowe, Jr., Delmar, $28,515. **P.W.A.** Bids Oct. 15. Noted Oct. 11.

N. Y., Eden—Town Bd., Town Hall, wells for waterworks, to Sprague & Henwood, Scranton, Pa., $8,995. **P.W.A.** Noted Oct. 18.

N. Y., Jordan—Village constructing 200,000 gal. reservoir, repairing existing reservoir, day labor, under supervision of S. N. Grimm, village engr. $18,000. TERA project. Noted Oct. 18.

N. Y., New York—Dpt. Water Supply, Gas & Electricity, Municipal Bldg., two 72 in. watermains in Central Park and 5th Ave., to Bronx Water Works Corp., 1 Riverdale Ave., $148,000. Bids Nov. 19. Noted Nov. 15.

N. Y., Ransomville—Town Bd., wells for waterworks, to Layne-New York Co., Inc., 92 Liberty St., New York, $10,500. **P.W.A.** Bids Oct. 18. Noted Oct. 15 Daily.

N. Y., Stillwater—Village, c.i. pipe and specials for water supply, to U. S. Pipe & Fdry. Co., Lincoln-Liberty Bldg., Phila., Pa., $16,833 ***installing pipe, valves and specials, to W. G. Fritz Co., Inc., 60 Main St., West Orange, N. J., $42,870***steel standpipe, to Chicago Bridge & Iron Wks., 165 Bway., New York, $4,100***two 10 in. well screens, to S. Stothoff Co., Inc., Flemington, N. J., $1,480*** pumping station building, reaction chamber, sewer, test well, etc., to Tuller Constr. Co., Inc., Red Bank, N. J., $10,506***gas engine, pumps, automatic control, filter aerator, etc., to Turbine Equipment Co., Inc., 75 West St., New York, $10,689. Grand total $86,478. **P.W.A.** Bids Oct. 18. Noted Oct. 11.

O., Youngstown—Municipality, pipe fittings for waterworks, to J. B. Clow Co., 201 North Talman Ave., Chicago, Ill., $1,900; valves, to R. D. Wood Co., Youngstown, $4,900. Est. $7,500.

Okla., Alva—City, new elevated water tank and watermain extensions, to Asplund Constr. Co., Enid, $36,173. Est. $50,000. Bids Nov. 23. **P.W.A.**

Pa., Pittsburgh—City, water line in Saline St., to H. Butch, 2 Emma St., $49,057; sewer in Culvert St. and sewer for Pennsylvania R.R. Co., to Sharpsburg Constr. Co., 1400 North Canal St., Sharpsburg, $891 and $3,487 respectively***sewer in Kanawha Way, to Bucci Constr. Co., 375 Boquet St., $449. Grand total $53,884.

S. C., Clinton — City, waterworks system, Sect. 1, new water supply, to Rickenbaker Constr. Co., Union, $60,453; Sect. 2, repairs and improvements to filtration plant, to C. M. Guest & Sons, Anderson, $13,517. Est. $78,000. **P.W.A.** Bids Nov. 20.

SEWERAGE AND WASTE DISPOSAL

PROPOSED WORK

Ark., Hot Springs—City made plans 2 sewage disposal plants. $300,000. Black & Veatch, 700 Mutual Bldg., Kansas City, Mo., engrs. Awaiting approval from P.W.A.

Conn., Plainville—Town, special meeting to make formal application soon, for disposal plant and sanitary sewer mains. $235,000. As FERA project Federal labor share $145,000, equipment and materials by town $90,000. Noted Aug. 17, 1933.

†**Illinois**—Dpt. Interior, Wash., D. C., plans sewage disposal system at Giant City Park. Awaiting approval. H. F. Ferguson, ch. sanitary engr. State Dpt. P. Health, Div. Sanitary Engineering.

Ill., Bement—City plans storm sewer. G. H. Baker, Bement, engr. Awaiting approval of H. F. Ferguson, ch. sanitary engr., State Dpt. Public Health, Div. Sanitary Engineering.

Ill., Danville—City defeated in referendum vote constructing sewage disposal plant and storm sewers and is uncertain when project will go ahead. $1,000,000. C. DeLeuw & Co., 20 North Wacker St., Chicago, engrs. Noted Oct. 4.

Ill., Elmhurst—City plans sand filter bed for garbage reduction plant. Suhr, Berryman, Peterson & Suhr, Inc., 310 North Wells St., Chicago, engrs. Awaiting approval of H. F. Ferguson, ch. sanitary engr. State Dpt. P. Health, Sanitary Engineering.

Ill., Ladd—Village making plans and takes bids early in 1935, sewage disposal plant, sanitary sewers, activated sludge type, 7,600 ft. 24 in. sewer pipe, primary and secondary treatment plants. $47,000. P.W.A. project. C. DeLeuw Co., 20 North Wacker Dr., Chicago, engrs. Noted Mar. 15.

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Mich., Gladstone—City defeated $95,000 for sewage disposal plant. Noted Aug. 30.

Mich., Kalamazoo—See "Waterworks."

Minn., Aurora—Village plans sewage disposal system, 1,000 ft., 20 in. interceptor sewer and treatment plant, $50,000. May hold special bond election. F. C. Perry, 804 Alworth Bldg., Duluth, engr.

N. C., Raleigh—City takes bids in January, 2 sewage disposal plants and sewer outfall plant at Crabtree Creek, outfall at Walnut Creek, $500,000. P.W.A. project. United Engineers & Constructors, Inc., 1401 Arch St., Phila., Pa., consult. engrs. Noted Nov. 15.

BIDS ASKED

Conn., Danbury—See "Contracts Awarded."

Ill., Pittsfield—Dec. 14, by Bd. Local Imprvts., 211½ North Monroe St., sewage treatment plant improvement for complete treatment of sewage, incl. 3,185 cu.yd. earth excav., 9,400 lb. reinforcing steel, 291 cu.yd. cement, 1,600 tons stone filtering media, 1 metal revolving distributor, 8,150 lb. 4- to 10-in. c.i. pipe, 620 sq.yd. vitr. clay underdrains, 1 pump station with pumps, plumbing, electrical work, 1 primary tank, 1 dosing tank, etc., $25,000. Caldwell Eng Co., Jacksonville, engrs.

Ia., Cedar Rapids—Dec. 11, by City Council, constructing Sect. J of sewage treatment plant, incl. one 70 ft. diam. storage tank, two 50 ft. diam. clarifiers, 1 chemical mixing tank, control house, mechanical equipment, pipe lines, landscaping, driveway surfacing, fencing and miscellaneous items. $75,000. F. E. Young, city engr. H. R. Greene Co., Bever Bldg., consult. engrs.

Mich., Jackson—Dec. 20, at office P. E. Campbell, city mgr., City Hall, complete sewage treatment works, comprising grit chambers, primary or presettling tanks, power house, aeration tanks, sludge settling tanks, sludge digestion tanks, covered sludge drying beds and all appurtenances. Fargo Eng. Co., Union and Peoples Bank Bldg., consult. engrs.; adv. E.N.R. Dec. 6.

Mo., Joplin—Dec. 11, by J. J. Saunders, comr. Streets & Public Imprvts., sewer extensions, $90,000. P.W.A. project. J. B. Hodgdon, city engr. Noted Feb. 23, 1933.

N. Y., New York—See "Streets and Roads."

N. Y., White Plains—Dec. 18, by Commissioner Pub. Wks., 255 Main St., sewers in Hubbard Dr., $6,410; Carrigan Ave., $7,776; West St., $11,260; Westchester Ave., $14,196; Ridgeway Village, $14,339. P.W.A. project. Noted Aug. 16.

Pa., Kutztown—See "Contracts Awarded."

Tex., Austin—Dec. 13, by City, c/o J. G. Morgan, mgr., sewer improvements, incl. 800 yd. earth excav. in channel, 19,400 yd. trench excav. for 3 in. vitr. clay pipe, 17,900 yd. trench excav., for 36 in. monolithic concrete pipe (alt.); 20,000 yd. trench excav. for 36 in. precast rein.-con. pipe (alt.); 17,200 yd. trench excav. for 36 in. plain monolithic concrete pipe (alt.); 12,454 lin.ft. 36 in. vitr. clay pipe with alt. on monolithic concrete, precast or plain concrete pipe; 396 lin.ft. 36 in. Class A c.i. pipe; 6,750 lin.ft. concrete saddle, 100 yd. 2,500 lb. in c.i. pipe piers; 6,000 lb. reinforcing steel; 8 manholes 6 ft. deep, 24 lin.ft. additional depth of manholes over 6 ft. $85,000. P.W.A. project. J. E. Motheral, city engr. Hawley, Freese & Nichols, Capps Bldg., Fort Worth, consult. engrs. Noted Nov. 15.

CONTRACTS AWARDED

Ala., Fairhope—Town Clerk, sewage disposal plant, to Dyson & Co., Fairhope, $10,968; 46,000 ft. 8 in. sewers, clarifier, digester, sludge bed, pumping station and outfall line, to Saugoton & Murphey, Orlando, Fla., $42,328. **P.W.A.** Bids Nov. 16. Noted Nov. 8.

Calif., Brawley—City, extension to sanitary sewerage system, incl. 27,347 ft. 8- to 21-in. vitr. clay pipe, 122 manholes, etc., to Artukovich Bros. and Bebek & Brkich, (plant) 912 South Atlantic Blvd., Hynes, $77,379. Est. $108,000. **P.W.A.** Bids Nov. 7, awarded Nov. 21. Noted Nov. 1.

Conn., Danbury—City, disposal plant, day labor, by P. Wks. Dpt. Equipment being purchased. Est. $200,000. P.W.A. project. Sanborn & Bogart, 30 Church St., New York, engrs.

Conn., Hartford—Bd. Contr. & Supply, administration building and preliminary treatment parts of sewage treatment plant, to F. H. McGraw Co., 51 East 42nd St., New York, $238,185. Noted Oct. 25.

Conn., Willimantic—Town, constructing sewage disposal plant at Horseshoe Bridge. Owner builds with FERA labor. To exceed $50,000. N. S. Hill, Jr., 112 East 19th St., New York, engr.

Mo., Monett—City, sewage disposal plant, equipment, auxiliary piping, etc., to D. P. Pray, Monett, $45,283 with deductions off. **P.W.A.** Bids Nov. 27. Noted Nov. 15.

Pa., Kutztown—Bd. Trustees State Teachers College, T. A. W. Rohrbach, pres., authorized $150,000 improvement program at school, incl. $60,000 for sewage disposal plant, $28,000 for development of athletic field, incl. gridiron and

†*Federal Government.*

Sewerage, etc. (Continued)

stands of concrete and removal of 3,500 cu.ft. earth and miscellaneous other work at college. SERB project. Work will be done by day labor. **Maturity at once.**

Pa., Pittsburgh—See "Waterworks."

Tex., Stanton—City, c/o C. Ebbersol, mayor, sanitary sewerage system, invloving vitr. tile pipe, trenching and covering, manhole drops, well and equipment, to Employees Constr. Co., Wichita Falls, approximately $29,280 (tentative award). **P.W.A.** Noted Nov. 22.

Vt., St. Albans—City, B. M. Hopkins, clk., City Hall, sewage works north of city and outfall sewer extending to Stevens Boro. Proposal A, to Adams Bros. Constr. Corp., Rogers Bldg., Glens Falls, N. Y.***Proposal D, furnishing vitr. tile pipe, to W. B. Fonda Co., St. Albans***Proposal F, furnishing c.i. pipe, to Central Fdry. Co., 420 Lexington Ave., New York. **P.W.A.** Bids Nov. 1, awarded about Nov. 27. Rejected bids Proposal E, furnishing concrete pipe, no concrete pipe to be used. Noted Nov. 15.

Va., Clarendon—Arlington Co., sewers, Contr. 13, to DeLashmutt Bros., Arlington Co., $146,466***Contrs. 14 and 16, to J. B. McCrary Co., 22 Marietta St., Atlanta, Ga., $30,948 and $47,229 respectively***Contr. 15, to J. A. Laporti Co., 11 West 42nd St., New York, $112,542***Contr. 17, to Rose & Reddick, 1319 West Virginia Ave., Wash., D. C., $47,598. Grand total $384,783. **P.W.A.** Bids Nov. 13.

Wis., Cudahy — City Council, constructing storm and relief sewers, to F. A. Goll, 493 West State St., Milwaukee, $78,228. **P.W.A.** Bids Nov. 5.

BRIDGES AND GRADE CROSSINGS

PROPOSED WORK

New York—Public Service Comn., Albany, plans eliminating 56 grade crossings in 1935. Total cost $55,334,200. Complete list of grade crossing projects supplied upon request. Address **Business News Dpt., McGraw Hill Publishing Co., Inc., 330 West 42nd St., New York, N. Y.**

N. Y., Brooklyn—Dpt. Plant & Structures, Municipal Bldg., New York, made plans and takes bids early in 1935, constructing Washington Avenue Bridge over Wallabout Canal. $469,000. P.W.A. project. L. C. L. Smith, Municipal Bldg., New York, engr. Noted Oct. 18.

Tex., Port Arthur—Jefferson Co., Port Arthur, and Federal Government plans approved by Legislature, constructing rein.-con. steel bridge over Neches River between Beaumont and Port Arthur, 176 vert Clear, $1,500,000. A. P. Rollins, Port Arthur, engr. Noted Nov. 29.

BIDS ASKED

Alabama—See "Streets and Roads."

California — Dec. 19, by State Hy. Comn., Sacramento, C. H. Purcell, engr., P. Wks. Bldg., Sacramento, rein.-con. bridge, consisting of one 205 ft. arch span, four 40 ft. and one 20 ft. rein.-con. girder spans on concrete piers and abutments, over North Fork of Feather River at Rock Creek, Plumas Co.

California—Dec. 20, by State Dpt. P. Wks., San Francisco-Oakland Bay Bridge, 500 Sansome St., San Francisco, constructing rein.-con. viaducts, grading, paving streets, all incidental work, necessary to complete in all respects, except wiring, fixtures for lighting of bridge, the San Francisco section and approaches, bids under 2 divisions, Contr. 15, San Francisco Sect. and Contr. 15A, San Francisco Approach, in connection with San Francisco-Oakland Bay Bridge, C. H. Purcell, P. Wks. Bldg., Sacramento, engr.

Illinois—Dec. 12, by Dpt. P. Wks. & Buildings, Div. Hys., Springfield, subway structure on F. A. Project NRS 426A, Route 2, Sect. 36SB-NRS; subway structure north of Byron, NRS 426A, Route 2, Sect. 36-SB-NRS, both Ogle Co.; viaduct NRH 19D, Route 5, Sect. 21VB-NRH and 21VC-NRM, Stephenson Co.; subway structure north of Oswego, NRS 439A, Route 18, Sect. 12X-SB, NRS, Kendall Co.; subway structure near Pearl, NRH 200C, Route 100, Sect. 120SB-NRH Pike Co.; bridge, NRH 215A, Route 10, Sect. 13B-NRH and 1013C, NRH, Jackson Co. E. Lieberman, ch. engr.

Ia., Waukon—Dec. 12, by Allamakee Co., 150x20 ft. continuous I-beam bridge, on Sect. 23, Waterloo Twp. H. Orr, co. engr.

New Jersey—Dec. 17, by State Hy. Comn., Trenton, constructing bridge to carry State Hy. Route 23, Sect. 12B over tracks of Erie R.R., at Pompton Plains, **Morris Co., Incl. 845 cu.yd.** found. excav. A. L. Grover, ch. clk.; adv. E.N.-R. Dec. 6.

New York—See "Streets and Roads."

N. Y., South Beach—See "Contracts Awarded."

Pennsylvania—See "Streets and Roads."

South Carolina—Dec. 13, by State Hy. Dpt., Columbia, constructing 142.04 ft. treated timber, rein.-con. structural steel bridge over Southern R.R. on Routes 2 and 21, NRH 356, Calhoun Co., $8,250; 90 ft. rein.-con. bridge over Maple Swamp, Route 57, NRS 386-A, Dillon Co., $7,000; 90 ft. rein.-con. bridge over creek on Route 38, NRH 313-B, Marion Co., $6,750.

Virginia—See "Streets and Roads."

Washington—See "Streets and Roads."

CONTRACTS AWARDED

Georgia—State Hy. Bd., Atlanta, constructing 2 bridges at Cedar Creek, State Project 932-D, Abbeville-Hawkinsville Rd., Wilcox Co., to Way Constr. Co., Valdosta, $10,797***repairing bridge over Satilla River, on Coastal Hy., near Woodbine, State Project 432-B, Camden Co., to Burke Constr. Co., Dyal Upchurch Bldg., Jacksonville, Fla., $9,977***constructing 2 bridges on Lincolnton-Augusta Rd., N.R.S. 506-C, Columbia Co., to Nichols Constr. Co., 1281 La France St. N. E., Atlanta, $11,274***constructing bridge on Albany-Cordele Rd., N.R.S. 536, Dougherty Co., to M. R. Woodall Co., Inc., 1594 Lakewood Ave. S. E., Atlanta, $13,192*** 2 bridges on Jesup-Brunswick Rd., N.R.H. 154 A and B, Wayne Co., to Beckham-Lawler Constr. Co., Perry, $18,214. Grand total $63,454. **P.W.A.** Bids Nov. 23. Noted Nov. 15.

Idaho—G. E. McKelvey, comr. P. Wks., Boise, constructing viaduct and grading, surfacing 1.022 mi. Elmore Co., to Triangle Constr. Co., Boise, $55,670. Bids Oct. 16.

Illinois—See "Streets and Roads."

Ill., Chicago—See "Streets and Roads."

Iowa—State Hy. Comn., Ames, culverts, extensions in Adams and Guthrie Counties, to S. C. Anderson, Des Moines, $10,737 and $9,580 respectively***culverts in Hancock and Kossuth Counties, to Hildebrand & Kragh, Belmond, $3,694***in Monroe Co., to G. H. Lowe, Cedar Rapids, $6,802***bridge in Page Co., to E. A. Wickham & Co., Council Bluffs, $5,392. Grand total $36,205. **P.W.A.** Bids Nov. 20. Noted Nov. 15.

Iowa—South Omaha Bridge Comn., Livestock Exch. Bldg., Omaha, Neb., constructing 430 ft. viaduct and approach over Burlington tracks in Iowa, near Council Bluffs, near east end of South Omaha. Bridge (now under construction) at L St., Omaha, to Wickham Bridge & Pipe Co., Omaha, Neb., $33,900, who has assigned the same to Council Bluffs Constr. Co.

Louisiana—State Hy. Comn., Baton Rouge, completion of superstructure of Red River Bridge at Alexandria on Alexandria-Shreveport Hy., Rapides Parish, Project 4905, Contr. 3, to Nashville Bridge Co., foot of Shelby Ave., Nashville, Tenn., $208,882***completion of approaches to Ouachita River Bridge, Monroe, on Monroe-Shreveport Hy., Project 4604, Contr. 3, Ouachita Parish, and completion of approaches to Red River Bridge at Alexandria, also completion of railroad overpass at Enterprise on Alexandria-Shreveport Hy., Project 4905, Contr. 2, Rapides Parish, to Central Constr. Co., Inc., Monroe, $73,371 and $127,220 respectively*** completing superstructure of Ouachita River Bridge on Monroe-Shreveport Hy., Project 4604, Contr. 4, Ouachita Parish, to Vincennes Bridge Co., Vincennes, Ind., $255,608. Grand total $665,081. Noted Oct. 25.

Massachusetts—Commonwealth of Massachusetts, Dpt. P. Wks., 100 Nashua St., Boston, creosoted pile and timber bridge with single leaf bascule, 21 spans, totaling 351 ft., and 1,287 ft. 20 ft. bituminous concrete approaches, State Aid Project, between Oak Bluffs and Tisbury, to Rendle Contractors & Dock Builders Co., 230 Meridian St., East Boston, $92,240. Bids Nov. 20, awarded Nov. 28. Noted Nov. 15.

Montana—State Hy. Comn., Helena, bridges in Wibaux and Broadwater Counties, to Rue Bros., Bismarck, N. D., $3,720 and $66,415 respectively***Judith Basin and Golden Valley Counties, to W. Mackin, Brockway, $9,023 and $3,598 respectively***Meagher Co., to W. P. Roscoe Co., Billings, $3,895***Broadwater Co., to McLaughlin Constr. Co., Livingston, $13,998***Powell Co., to J. Iten, Hamilton, $3,578. Grand total $104,227. **P.W.A.** Bids Nov. 27.

New York—A. W. Brandt, comr. Hys., Albany, bridges in Saratoga Co., to J. F. Starstrom, Merrick, $13,460 est. $15,993***in Delaware and Otsego Counties, to E. V. Chappell, Binghamton, $330,790 est. $381,855***Tioga Co., to J. F. Morgan Olean, $93,996 est. $105,007***gravel surfacing, incl. 100 ft. girder bridge, Franklin Co., to Spellman-Oliver Co., Chateaugay, $30,134 est. $24,627. Grand total $468,380. **P.W.A.** Bids Oct. 9, Nov. 13 and 20.

N. Y., South Beach — J. A. Palma, pres. Richmond Boro, St. George, constructing temporary timber bridge over New Creek between Quincy Ave. and Comache St., day labor. $30,000. FERA project.

North Carolina—State Hy. and P. Wks., Raleigh, bridge and approaches, Project 7490, at Walnut Cove, Stokes Co., to F. A. Triplett, Chester, S. C., $41,543.

North Dakota—State Hy. Dpt., Bismarck, bridges on NRS 456 and NRS 470B, to Rue Bros., Bismarck, $23,162 and $4,370 respectively ***on NRH 345 CD, to C. L. Lindberg, James-

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†*Federal Government.*

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Bridges, etc. (Continued)

town, $10,455. Grand total $37,987. Bids Nov. 23. Noted Nov. 15, under "Streets and Roads."

Ohio—O. W. Merrell, dir. Hys., Columbus, constructing open-spandrel steel arch viaduct consisting two 256 ft. arch spans, 2 spans each 236.69 ft. and five steel beam approach spans, etc., over Rocky River, Cleveland and Fairview, and paving with brick, incl. furnishing, delivering brick 0.286 mi. hy. on Sects. "Cleveland" and "Fairview" Cleveland-Oberlin Rd., Cuyahoga Co., to Lowensohn Constr. Co., 1740 East 12th St., Cleveland, $535,472. Bids Nov. 16. Noted Nov. 1.

Washington—See "Streets and Roads."

Wisconsin—State Hy. Comn., Madison, bridge in Buffalo Co., to H. S. Kalliher, Washburn, $16,570; 3 bridges in Lafayette Co., to T. J. Vitcenda, Madison, $18,348. Bids Nov. 20.

STREETS AND ROADS

BIDS ASKED

Alabama—Dec. 14, by State Hy. Dpt., Montgomery, surface treating 3.328 mi. Troy-Elba Rd., Pike Co.; surfacing 3.143 mi. same road, Coffee Co.; grading, drainage, topsoil surfacing 1.624 mi. Clio-Blue Springs Rd., Barbour Co.; concrete paving 0.474 mi. Spring Hill Ave., Mobile, Mobile Co.; bit. paving 1.969 mi. Clanton-Selma Rd., Chilton Co.; grading, drainage, gravel surfacing 3.844 mi. Roanoke-Wadley Rd., Randolph Co.; bridges on same road; bit. paving 0.618 mi. hy. Haleyville, Winston Co.; double bituminous surface treating 6.702 mi. Pineapple-Camden Rd., NRH 94, Wilcox Co.; 1.173 mi. Camden-Greenville Rd., and double surface treating 0.727 mi. Camden-Greenville Rd., in Pineapple, all foregoing Project NRH 94, Wilcox Co.; improving 7.893 mi. Wilcox Co. line towards Greenville, NRH 255-B, Butler Co.; bit-surfacing 1.288 mi. Pineapple-Camden Rd., Pineapple, NRM 94 (1935).

Alabama—Dec. 22, by State Hy. Dpt., Montgomery, grading, drainage, gravel surfacing 9 mi. Selma-Camden Rd., Project S-375, Dallas and Wilcox Counties; 1,400 lin.ft. treated timber bridges on same road.

California—Dec. 19, by State Hy. Comn., Sacramento, grading, crusher run base and oil treated crusher run sufacing 2.6 mi. hy. between Route 2 and San Juan Baptista, San Benito Co. C. H. Purcell, P. Wks. Bldg., Sacramento, engr.

California—Dec. 19, by State Hy. Comn., Socramento, grading, asphaltic concrete paving 1.7 mi. hy. between Huron St. and San Pedro Ave., Daly City, San Mateo Co. C. H. Purcell, P. Wks. Bldg., Sacramento, engr.

Connecticut—Dec. 10, at office of J. A. Macdonald, state hy. comr., Hartford, trap rock waterbound macadam paving 5,871 ft. Cheshire Rd. from Route 63 to Route 69, Bethany, State Aid Project; 10 ft. skew span concrete slab bridge and waterbound macadam paving 6,696 ft. Kimball Hill Rd., Route 97, Hampton.

Connecticut—Dec. 17, at office J. A. Macdonald, state hy. comr., Hartford, 3 in. asphalt on 7 in. concrete paving 6,367 ft. hy. West Hartford, NRM 63-D, U.S. P.W. Project; rein.-con. paving 212 ft. Route 1, Greenwich; waterbound macadam paving 160 sq.yd. Route 69, Bristol; 24 ft. span concrete slab bridge over Salmon Brook, East St., Project 20, 20 ft. span concrete slab bridge on East St. known as Baytates Bridge, Project 21, and piles and other repairs to bridge over Salmon Brook on Hungary Rd., Project 22, foregoing in town of Granby; adv. E.N.-R. Dec. 6.

Illinois—Dec. 12, by Dpt. P. Wks. & Buildings, Div. Hys., Springfield, bituminous filled brick on concrete paving 2.48 mi. NRH 233B, Route 1, Sect. 21X-NRH Gordon North, Crawford Co.; concrete paving 1.9 mi. streets in Chicago, Sect. 2021Y NRH-1, Cook Co.; and bituminous retread on water bound macadam paving 2.92 mi. NRS 414A, Route SA8 7 NRS, Jersey Co.; grading 77,880 cu.yd. NRH 193C, Route 138, Sect. 101A-NRH Edwards and Wabash Counties. E. Lieberman, ch. engr.

Kansas—Dec. 11, by State Hy. Comn. at office of County Clerk, Independence, concrete paving, roadside improvement, chat surfacing, earthwork, culverts 39,604 mi. hys. in Allen, Neosho, Labette, Crawford, Greenwood and Montgomery Counties.

Kentucky—Dec. 12, by State Hy. Comn., Frankfort, grading, draining 3.8 mi. Beech Creek Junction-Ebenezer Church Rd. S.P. 405-A-G, Muhlenberg Co.

Massachusetts—Dec. 11, by Commonwealth of Massachusetts, Dpt. P. Wks., F. E. Lyman, comr., 100 Nashua St., Boston, bituminous macadam paving 8,608 ft. double roadway, also incl. rein.-con. pile bridge with four 22 ft. spans, on Projects NRH 251-A and NRM 251-B, Boston and Dedham. To exceed $150,000.

New Jersey—Dec. 17, by State Hy. Comn., Trenton, rein.-con. paving 2,814 mi. Route 2, Sect. 8B, Franklin Turnpike to Allendale Ave., Bergen Co., incl. 160,477 cu.yd. unclassified and 9,009 cu.yd. wet excav.; 1.497 mi. Route 23, Sect. 12B, Jackson Ave. to Riverdale, Morris Co., 30,035 cu.yd. unclassified and 22,073 cu.yd. wet excav.; 3.47 mi. Route 2, Sects. 8A and 7A, Allendale Ave. to West Saddle River Rd., Bergen Co., 145,000 cu.yd. unclassified excav.; 1.785 mi. Route 23, Sect. 12C, from Black Oak River Rd. to Jackson Ave., Passaic and Morris Counties, 14,881 unclassified excav. A. L. Grover, ch. clk.; adv. E.N.-R. Dec. 6.

New York—Dec. 18, by A. W. Brandt, comr. Hys., Albany, graveling 2.29 mi. Clinton Co.; 2.45 mi. Cortland Co.; 6.4 mi. Herkimer Co.; 5.42 mi. Madison Co.; 4.65 mi. Montgomery Co.; 4.71 mi. Tompkins Co.; 3.85 mi. Yates Co.; grading, stone faced concrete seawall 0.65 mi. Kings Co.; bituminous macadam paving 0.84 mi. Monroe Co.; truss bridge and bituminous macadam paving 0.4 mi. approaches Broome Co.; grade crossing elimination and 0.19 mi. paving approaches Chautauqua Co. P.W.A. project; adv. E.N.-R. Dec. 6.

N. Y., New York—Dec. 12, by J. J. Lyons, pres. Bronx Boro, Crotona Park, 3rd and Tremont Aves., grading, curbing, drains, guard rails, Pelham Park South, West 236th St., Mayflower, Taylor, Young, Waring and Barnes Aves.; sewer in West 236th St.

†N. Y., West Point—Dec. 10, by Con. Q.M., U. S. Military Academy, constructing roads, walks, curbs, etc., at this station; adv. E.N.-R. Dec. 6.

North Dakota—Dec. 21, by State Hy. Comn., Bismarck, gravel surfacing and stock pile on 12.325 mi. Drayton West Rd., NRH 437C, Pembina Co., $43,604; 9.289 mi. east of Dazey, NRH 359B, Barnes Co., $13,508; 12.731 mi. Ruso north and south, NRH 417C and NRM 417D, McLean Co., $14,314; 8.59 mi. Study north and south, NRH 393F, Divide Co., $10,432. T. G. Plomasen, hy. comr.

Ohio—Dec. 15, by O. W. Merrell, dir. Hys., Columbus, grading, draining, brick paving, incl. furnishing, delivering brick 0.56 mi. Sect. "Sidney" (Ohio Ave.) Sidney-Wapakoneta Rd., Shelby Co., $8,853; grading, draining, concrete widening and hot mixed asphaltic concrete repaving 1.958 mi. Sect. "W" Chagrin Falls-Greenville Rd., Gauga Co., $81,965•••grading, building storm sewer, widening and brick paving, incl. furnishing, delivering brick 2.628 mi. Sect. "Sagamore Hill" and "Northfield" (part) Akron-Cleveland Rd., Summit Co., $295,563.

Oklahoma—Dec. 11, by State Hy. Dpt., Oklahoma City, grading, drainage 4.87 mi. State Highway 35, Blaine Co., $38,000; 2.34 mi. State Hy. 60, Nowata Co., $39,000. C. L. Wilson, state hy. engr.

Pennsylvania—Dec. 14, at office S. S Lewis, secy. Hys., Harrisburg, rein.-con. and vitr. brick paving, grading, bridging hys. in Allegheny, Armstrong, Beaver, Westmoreland and Wyoming Counties; adv. E.N.-R. Dec. 6.

Pa., Kane—See "Contracts Awarded."

South Carolina—Dec. 13, by State Hy. Dpt., Columbia, clearing, grubbing, bituminous surfacing 4.752 mi. Route 64, NRS 367-B, Sects. 1 and 2, Barnwell and Bamberg Counties, involving 11,597 cu.yd. common excav., $58,000; curbing, guttering, bituminous surfacing on Routes 3 and 64, NRM 117-C and NRM 151-B, Barnwell Co., 2,109 cu.yd. common excav., $32,000; bituminous surfacing, clearing, grubbing 3.562 mi. Route 392, NRS 376 A and B, Saluda and Aiken Counties, 33,363 cu.yd. common excav., $46,000; 5.444 mi. Route 18, NRS 365-B, Oconee Co., 47,885 cu.yd. unclassified excav., $60,000; grading 1.179 mi. Route 38, NRH 313-B, Marion Co., 20,393 cu.yd. common excav., $15,000; 3.668 mi. Routes 2 and 21, NRH 356, Calhoun Co., 56,908 cu.yd. common excav., $27,500; 6.548 mi. Route 57, NRS 386-A, Dillon Co., 75,449 cu.yd. common excav., $51,000.

Tennessee—Dec. 14, by State Dpt. Hys. & P. Wks., Nashville, roadside development 5.506 mi. State Hy. 34, N.R.H. 6-A, reopened; grading, drainage, paving 0.238 mi. State Hy. 34, West Market St., Johnson City, N.R.M. 6-D, both Washington Co.; paving 1.22 mi. north side of Harding Rd. and widening and bridge from Davidson Rd. to Belle Meade Blvd., N.R.H. 75-B, N.R.H. 87- and NRM 87, Davidson Co.

Virginia—Dec. 18, by State Hy. Dpt., Richmond, rein.-con. paving 2.6 mi. Route 1, State Project NRH-358HWA1, State Fed. Project NRH 362A1, 4, Hanover Co.; 4.5 mi. same route, State Project NRH 358JW2, 35, Fed. Project NRH 362A, 2, 3, 5, Caroline Co.; 5 mi. Route 58, State Project NRH 657EW1, Fed. Project NRH 396B; 0.4 mi. Route 60, State Project NRM 1060C, Fed. Project NRM 375D, both Norfolk Co.; macadam surfacing 1.8 mi. Route 8, State Project NRH 568CM, Fed. Project NRH 355C, Montgomery Co.; soil on 7.7 mi. Route 284, NRH 756 HL, Fed. Project NRH 3831, Cumberland Co.; 1.4 mi. Route 30, State Project NRS 1009DE2, Fed. Project NRS 504AB, King William Co.; bridge on 1.3 mi. Route 6, State Project NRH 1086 AB1, Fed. Project NRH 487B, Fluvanna Co.; on 3.5 mi. Route 65, NRS 1010CDB1, 2, Fed. Project NRS 434B, Lee Co.

Washington—Dec. 18, at office L. V. Murrow, dir. Hys., Oylmpia, concrete paving 1.5 mi. State Rd. 1, East Marginal Way, Seattle, NRM 150-E, and NRH 150-E, King Co., incl. 5,700 cu.yd. excav.; 1.6 mi. State Rd. 1, Lakeview-Union Ave. Rd., NRH 171-E, Pierce Co.; 4.4 mi. State Rd. 1, Lake Samish Rd. Branch, Bellingham South-Paving NRS 191-B, Whatcom Co.; straightening, widening and deepening Roslyn Creek, State Rd. 2, NRM 114-H.

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†Federal Government.

Streets and Roads (Continued)

Kittitas Co., 1,370 cu.yd. excav.; crushed stone surfacing, stockpiling, oil rock, and bituminous mat surfacing by bituminous macadam method 2.7 mi. State Rd. 8, Yakima, Klickitat Co. to Reservation Boundary, Fed. Land Project 3, Klickitat Co.; grading, crushed stone surfacing, rein.-con. girder bridge 0.8 mi. Methow Valley Highway, Methow River Bridge and approaches, at Carlton, NRS 195-C, Okanogan Co., incl. 13,960 cu.yd. excav.; grading, timber bridges on 1.6 mi. Washougal River County Rd., Washougal-East NRS 214-A, Clark Co., 29,375 cu. yd. excav.; grading, crushed stone and bituminous surfacing 4.9 mi. County Rd. Stanwood-Utsaldady NRS 218-A, Island Co., 20,890 cu. yd. excav.

Ontario—Dec. 10, by R. A. Campbell, deputy minister Dpt. Northern Development, Toronto, clearing, grading 17 mi. North Bay-Temiskaming Rd., North Bay, $50,000; 6.5 mi. Algonquin Park-Whitney Rd., Algonquin Park, $25,000.

CONTRACTS AWARDED

Alabama — State Hy. Dpt., Montgomery, bituminous paving 6.469 mi. Mobile-Montgomery Hy. Conecuh Co., to Reynolds & Sutton, Tyler, Tex., $76,202***grading, drainage, chert surfacing 3.686 mi. Larkinsville-Scottsboro Rd., Jackson Co., to T. M. Strider, Cotton States Bldg., Nashville, Tenn., $74,922*** 2.376 mi. Walnut Grove-Blount Co. Line Rd., Etowah Co., to Chapman Sease and O. K. Parsons, Montgomery, $20,271***bridges on Centerville-Maplesville Rd., Bibb Co., to W. F. Scott, Thomasville, $11,942***grading, drainage, gravel surfacing 3.171 mi. Centerville-Maplesville Rd., Bibb Co., to C. C. Moore Constr. Co., Panama City, Fla., $31,860***concrete paving 3.689 mi. Huntsville-Hazelgreen Rd., Madison Co., to Municipal Paving & Constr. Co., Cotton States Bldg., Nashville, Tenn., $88,269. Grand total $303,466. Bids Nov. 16.

Arizona—State Hy. Comn., Phoenix, grading, draining, placing select material on Holbrook-St. Johns Hy., NRH 78-H, to Lee Moor Contg. Co., 807 Bassett Tower, El Paso, Tex., $59,103. **P.W.A.** Bids Nov. 20.

Arizona—State Hy. Comn., Phoenix, curbing, guttering, oil surfacing, etc., 0.3 mi. Flagstaff-Winslow Hy., NRH 22, to Southern California Roads Co., 2145 East 25th St., Los Angeles, Calif., $15,092; grading, draining, 2 in., asphaltic retread surfacing Prescott-Flagstaff Hy. (Jerome street) NRM 96-A, to Pearson & Dickerson Contractors, Inc., Prescott, $19,485. **P.W.A.** Bids Nov. 8. Noted Nov. 1.

†**Colorado**—Pub. Rds., Denver, Colo., base course surfacing 4.222 mi. road in Rocky Mountain National Park, to Van Winkle & Finger, 1609 Ford St., Golden, $20,865. Bids Oct. 31.

Connecticut—J. A. Macdonald, state hy. comr., Hartford, waterbound macadam paving 8,350 ft. Roxbury Falls Rd., Route 131, Roxbury, to T. Zolli, 52 Tracy Ave., Torrington, $52,085***amiesite paving alternate (1) 1,650 ft. Route 75 and 190, Suffield, to W. H. Hall Constr. Co., 408 Main St., Hartford, $4,692*** Alternate (2) colprovia paving 1,650 ft. same road, to New Britain Trucking Co., 377 Allen St., New Britain, $5,428. Grand total $62,205. Bids Nov. 19. Noted Nov. 15.

D. C., Wash.—District Comrs., District Bldg., paving certain streets, to Corson & Gruman, 33rd and K Sts. N.W., $29,999; grading bridge approaches, to W. F. Brenzier Co., 1501 South Capitol St., $19,500.

Georgia—State Hy. Bd., Atlanta, paving 4.863 mi. McDonough-Atlanta Rd. and constructing 3 bridges on same road, N.R.H. 258-B, Clayton Co., to Hardaway Constr. Co., Columbus, $136,218***grading 5.84 mi. Birmingham, Ala.-Chattanooga, Tenn. Rd., and bridge on same road, N.R.H., Dade Co., to Nichols Contr. Co., 1281 La France St. N. E., Atlanta, $107,824***grading, 2 bridges 4.266 mi. Waycross-Tipton Rd., N.R.H. and M. 403-C, Berrien Co., to John Monaghan, Inc., Pelham, $33,959*** paving 0.382 mi. Dublin-Macon-Atlanta Rd., N.R.M. 53 B and 272 B, Bibb Co., and 1.384 mi. Columbus-Hamilton Rd., N.R.M. 453 C, Muscogee Co., to M. J. Carroll, Inc., Ocala, Fla., $37,989 and $61,065 respectively*** 0.824 mi. Gainesville-Athens Rd., N.R.M. 329 N, Hall Co., to Pennell & Harley, Inc., Spartanburg, S. C., $48,651*** grading 3.864 mi. Albany-Cordele Rd., N.R.S. 536, Dougherty Co., to Beckham-Lawler Constr. Co., Perry, $20,997*** 0.196 mi. Winder-Gainesville Rd., N.R.S. 529 A, Jackson and Barrow Counties, to D. B. Scott & Co., Decatur, $35,672***2.943 mi. Jesup-Brunswick Rd., N.R.H. 154 A and B, Wayne Co., to W. F. Scott, Thomasville, $35,260***constructing approaches at Uchee Creek 1.104 mi. Lincolnton-Augusta Rd., Columbia Co., to M. R. Woodall Co., Inc., 1594 Lakewood Ave. S. E., Atlanta, $14,707. Grand total $532,342. **P.W.A.** Bids Nov. 25. Noted Nov. 15.

Idaho—G. E. Kelvey, comr. P. Wks., Boise, constructing roadbed and drainage structures on 10.72 mi. Owyhee Hy., from Squaw Creek to Oregon Line, to Morrison-Knudsen Co., Boise, $88,228. **P.W.A.** Bids Nov. 16.

Illinois—State Dpt. P. Wks. & Buildings, Div. Hys., Springfield, grading 4.39 mi. and bridge west of Peoria, Peoria Co., to Jansen & Schaefer, Pekin, $79,765 and $5,224 respectively***paving 0.99 mi. gaps and approaches to Chicago, Burlington & Quincy R.R., subway south of Golden, Adams Co., to Triangle Constr. Co., Kankakee, $36,954. Grand total $121,943.

Ill., Chicago—Dpt. P. Wks. & Buildings, Div. Hys., to Arcole Constr. Co., Niles Center, concrete paving 0.1136 mi. Sect. 110-3223-15D, rein.-con. bridge on same road, near Northfield, $42,343; concrete paving 2.0683 mi. Sect. 041-0709-15D, near Chicago, $197,883; three 50 ft. span rein.-con. deck girder bridge Sect. 105-222-15D, near Glencoe, $71,148***to I. D. Lain, Morton Grove, 0.6294 mi. Sect. 031-1313-15D, near Chicago, $21,865, all foregoing Cook Co. Grand total $333,239.

Ill., Hillsboro—Dpt. P. Wks. & Buildings, Div. Hys., traffic bound surfacing 2.7958 mi. road near Chapman, Montgomery Co., to Edwardsville Constr. Co., Edwardsville, $29,005. Bids Sept. 15.

Indiana—State Hy. Comn., Indianapolis bituminous mulch, liquid asphalt surfacing 6.7 mi. Clay Co., to R. Myers, Campbellsburg, $23,265***5.6 mi. in Owen Co., to Rosenberry & Gunsculles, Butler, $20,614***5.2 mi. Jackson Co., to Brooks Constr. Co., 1123 Barthold St., Fort Wayne, $19,075***8.6 mi. Greene Co., to H. A. Carpenter, Brazil, $31,923***7.5 mi. in Greene Co., to Bituminous Materials Co., Terre Haute, $29,016***9.3 mi. Greene Co., to Road Resurfacing Co., Bloomington, $32,117. Grand total $156,010.

Iowa—State Hy. Comn., Ames, paving 0.384 mi. road in Hardin Co., to Anderson & Empie, Marshalltown, $17,128***grading 4.472 mi. Adams Co. and 3.166 mi. Guthrie Co., to Partello Constr. Co., Boone, $20,060 and $19,022 respectively***4.558 mi. Hancock and Kossuth Counties, to L. O. Kimball, Clear Lake, $18,432***6.698 mi. Monroe Co., to C. R. Gates, Ottumwa, $25,205***graveling 2.174 mi. Allamakee Co., to Roverud Bros., Spring Grove, Minn., $4,106***6.561 mi. Cherokee Co., to Harvey Sand & Gravel Co., Harvey, $5,404*** 15.32 mi. Henry Co., to Dixon Constr. Co., Centerville, $23,095***1.25 mi. Sac Co., to L. P. Peters, Des Moines, $1,465. Grand total $133,916. **P.W.A.** Bids Nov. 20, awarded Nov. 26. Noted Nov. 15.

Kansas—State Hy. Comn. at office of County Clerk, Troy, (**P. means Project**), to D. H. Hardman, Alton, sand graveling 7.3 mi. P. 36-32-6284, $1,545; 9.6 mi. P. 36-33-6285, $2,031; 5 mi. P. 20-1-6313, $815, foregoing in Brown Co.; 15.7 mi. P. 20-2-6314, Doniphan Co., $2,559***to Blue Rapids Gr. Co., Blue Rapids, 4.6 mi. P. 71-1-6298, $966; 3 mi. P. 63-8-6299, $600; 7.9 mi. P. 63-7-6300, $1,659; 6.6 mi. P. 63-4-6301, $1,155, foregoing Nemaha Co.; 2 mi. P. 63-6302, $350; 6.2 mi. P. 63-2-63-3, $1,085, both Pottawatomie Co.; 7.8 mi. P. 36-36-6295, $2,122; 11.7 mi. P. 77-27-6296, $1,814; 13.8 mi. P. 77-26-6297, $1,449, foregoing in Marshall Co.***to Thogmartin-Reis Constr. Co., Fort Scott, 4.6 mi. P. 7-23-6311, $520; 7.5 mi. P. 7-21-6312, $1,118, both Johnson Co.; cover stone surfacing 1.7 mi. P. 75-6292, $385; 10 mi. P. 75-22-6293, $2,264; 8.8 mi. P. 50N-32-6294, C $1,993, both Osage Co.***to Roberts Constr. Co., Wichita, 7 mi. P. 31-1-63-7, $1,540; graveling 5.3 mi. P. 11-17-6308, $1,155; 3 mi. P. 11-16-6309, $708, both Wabaunsee Co.; 6.6 mi. P. 11-15-6310, Lyon Co., $1,650***to E. D. Rees, Clay Center, 3 mi. P. 29-1-63-6, Riley Co., $345*** to Kuhn & Pyle, Pattonsburg, Mo., 15.5 mi. P. 32-1-6304, Leavenworth Co., $3,528***to Cook & Cone, Ottawa, 9.2 mi. P. 508-39-6305, Osage Co., $1,996***to Sandy-Hites Constr. Co., City Bank Bldg., Kansas City, Mo., concrete paving 2.66 mi. P. 36-35-PWS. 1, $71,983*** to Lawson Landscape Service, McPherson, roadside improvement 2.66 mi. P. 36-35 PWS 1, $527, both Doniphan Co. Grand total $105,869. **P.W.A.**

Ky., Louisville—City, constructing alleys and sidewalks on various streets, to Woodruff & Co., 1046 Barret Ave., $60,000 and $5,400 respectively***alleys and sidewalks, to J. U. Schickli & Co., 1300 West Oak St., $4,483 and $700 respectively***sidewalks, to Southern Paving Co., New Albany, Ind., $300. Grand total $70,883.

Louisiana—State Hy. Comn., Baton Rouge, concrete paving 7.727 mi. Project 4807-B, on intersection Route 1252 to Elliott City Hy., St. Landry and Pointe Coupee Parishes, to T. L. James & Co., Ruston, $240,694. Noted Oct. 25. Bids Nov. 6.

Massachusetts—Commonwealth of Massachusetts, Dpt. P. Wks., F. E. Lyman, comr., 100 Nashua St., Boston, bituminous macadam and bituminous concrete paving 7.970 ft. Project NRH 176-B, Bourne, and bituminous macadam surfacing 7,167 ft. NRH 125-C, Bourne and Wareham, to Eastern Contg. Co., 499 Washington St., Quincy, $77,648 and $68,000 respectively. **P.W.A.** Bids Nov. 20, awarded Nov. 28. Noted Nov. 15.

Michigan—State Hy. Dpt., Lansing, Escanaba, removal of unsatisfactory subsoil and replacement with suitable grade material, gravel surfacing 0.55 mi. Project M-48-19C-3, Luce Co., to Detroit Asphalt Paving Co., 5900 East Nevada St., Detroit, $41,719.

Montana—State Hy. Comn., Helena, grading, surfacing 13.83 mi. Broadwater Co., to Hector Constr. Co., Hector, and Lobnitz Bros., Inc., Wilmar, $132,587***12.846 mi. in Judith Basin Co., to Lawler Corp. and Buck Helean, Butte, $90,635***5.149 mi. Golden Valley Co., to Collison & Dolven, Inc., Billings, $16,211*** 3.438 mi. Chouteau Co., to F. J. Haas, Helena, $32,698***4.989 mi. Powell Co., to J. C. O'Connor, Butte, and F. J. Haas, Helena, $29,655*** 5.519 mi. Rosebud Co., to Prahl & Sawtell, Inc., Miles City, $38,883***6.54 mi. Meagher Co., to E. L. McNutt, Eugene, Ore., $70,553***6.637 mi. Wibaux Co., to Inland Constr. Co., 3867 Leavenworth St., Omaha, Neb., $59,146. Grand total $470,368. **P.W.A.** Bids Nov. 27.

Nevada—State Hy. Comn., Carson City, constructing 6.16 mi. in Nye Co., to Dodge Constr. Co., Fallon, $63,635; reconstructing 49.78 mi. Elko Co., to Hoops Constr. Co., Twin Falls, Idaho, $100,812. Bids Nov. 27. Noted Nov. 20.

New Mexico—State Hy. Comn., Sante Fe, improving road in San Miguel Co., to E. W. Everly, Albuquerque, $30,700 est. $34,723*** Chaves Co., to W. H. Dennison, Carlsbad, N. M., and Cushman, Ark., $62,526 est. $87,367*** Taos Co., to Brown Bros., Albuquerque, $62,200 est. $53,409. Grand total $155,426. **P.W.A.** Bids Nov. 20.

New York—A. W. Brandt, comr. Hys., Albany, graveling 3.86 mi. Tioga Co., to E. V. Chappell, Binghamton, $26,356 est. $31,168 ***5.95 mi. Chautauqua Co., to Riefler Bros., Hamburg, $47,104 est. $50,493***4.16 mi. Wyoming Co., to Canty, O'Neill & Candell, Inc., Root Bldg., Buffalo, $35,434 est. $45,634*** 3.74 mi. Jefferson Co., to M. K. Eng. Co., Inc., Plaza St., Albany, $21,666 est. $25,921*** 5.35 mi. Saratoga Co., to J. J. Bellotte & Son Constr. Co., Troy, $33,121 est. $38,948***0.99 mi. in Seneca and Wayne Counties, and 3.45 mi. Wayne Co., to T. Fischette, Clyde, $6,137 and $14,968 respectively est. $8,180 and $20,694 respectively***5.74 mi. Otsego Co., to J. F. Paddelford, Sherburne, $32,148 est. $43,317*** 3.49 mi. Schenectady Co., to S. B. Easton, Albany, $20,561 est. $24,357***2.47 mi. Seneca Co., to J. M. Murray, 42 East Ave., Rochester, $11,794 est. $12,629***sewerage system in Queens Co., to Kennedy & Smith, Inc., Flushing, $18,239 est. $23,995. Grand total $267,528. **P.W.A.** Bids Oct. 23, Nov. 13 and 20. Noted Nov. 1 and 8.

N. Y., Brooklyn—R. V. Ingersoll, pres. Brooklyn Boro, Boro Hall, to Highway Impvt. & Repair Co., Furmans Island, asphalt repaving Cooper St., $3,890; Hart St., $9,444; Scholes St., $6,411***to D. J. McCoy Asphalt Corp., Avenue U and East 57th St., Denton Pl., $4,259 ***to T. Vitanza, 710 Avenue W, regulating East 38th St., $2,538***to B. Turecamo Contg. Co., New Cropsey Ave., asphalt paving Herkimer St., $8,023***to L. S. Contg. Co., 146 Skillman Ave., Williams Ave., $1,954; Avenue Z, $3,778. Grand total $40,297. Bids Nov. 9. Noted Nov. 1.

N. Y., New York—S. Levy, pres. Manhattan Boro, Municipal Bldg., sheet asphalt repaving Monroe St., to J. Meehan & Sons, 90 West St., $7,410***Bway., to Venetian Contg. Co., 2 Lafayette St., $84,247***asphalt block repaving Seaman Ave., to E. T. Barry, 126-06 139th Ave., Laurelton, $27,895***Wadsworth Ave., to Highway Impvt. & Repair Co., Furmans Island, Brooklyn, $6,165. Grand total $125,717. Bids Nov. 14.

N. Y., St. George—J. A. Palma, pres. Richmond Boro, Boro Hall, bituminous concrete repaving Bay St., to Vanbro Constr. Co., 721 Arthur Kill Rd., $46,995; asphalt block repaving Victory Bldg., to Certified Constr. Co., 287 Bway., West New Brighton, $6,119. Bids Nov. 21. Noted Nov. 15.

North Carolina—State Hy. and P. Wks., Raleigh (**P. means Project**), to Gassoway & Owen, Inc., Winston Salem, bituminous concrete on crushed stone paving 0.51 mi. P. 1371, Halifax Co., $21,993***to F. D. Cline, Raleigh, grading, natural sand clay surfacing 9.25 mi. P. 3450, Cumberland Co., $57,099***to Kiker & Yount, Reidsville, structures on foregoing road, $6,013; bituminous surface treating 3.52 mi. P. 8004, Avery Co., $13,800; 8.2 mi. P. 8496, McDowell Co., $30,231; crushed stone and bituminous surface treating 15.32 mi. P. 9331, Graham Co., $100,675***to R. B. Tyler Co., 1446 Levering St., Louisville, Ky., gravel surfacing 9.92 mi. P. 161, Halifax Co., $40,065***structures on foregoing road, to Little Building Co., Charlotte, $5,249. Grand total $275,125. Bids Nov. 21.

North Dakota—State Hy. Dpt., Bismarck, to Butler Constr. Co., 4100 North 6th St., Grand Forks, graveling 15.651 mi. Walsh Co., $18,016; grading, surfacing stock piles 22.399 mi. Stutsman and LaMoure Counties, $19,097; graveling 6.36 mi. Pembina Co., $10,499; 16.236 mi. Slope and Bowman Counties, $17,134***9.958 mi. Mountrail Co., $6,242; 10.204 mi. Mountrail Co., $6,827***to Lyle Sloan, Ellendale, Minn., 5.741 mi. Pierce Co., $4,461; 2.91 mi. Pierce Co., $3,589; 11.929 mi. Ward Co., $11,830; 6.771 mi. McHenry Co., $8,179; 8.377 mi. McHenry Co., $13,456; 9.966 mi. Dickey Co., $6,927; 4.041 mi. Pierce Co., $3,107; 3.385 mi. Sheridan Co., $3,220***to W. H. Noel, Jamestown, 6.39 mi. Stutsman Co., $10,101; 10.2 mi. Grant Co., $16,077***to Hector Constr. Co., Hector, Minn., 11.551 mi. Richland and Mercer Counties, $33,843***to Rue Bros., Bismarck, 1.536 mi. Mercer and McLean Counties, $2,750***to Advance Constr. Co., Fargo, 13.328 mi. Rolette Co., $18,885; 9.058 mi. Emmons Co., $4,776; 6.712 mi. Emmons Co., $5,730; 4.255 mi. Ransom Co., $4,293; 3.043 mi. Ransom Co., $2,199; 7.124 mi. Traill Co., $3,829***to Haas Contg. Co., Minot, 10.524 mi. McHenry Co., $12,458***to Megarry Bros., Bismarck, 16.227 mi. Adams Co., $18,203*** to F. O. Smith, Steele, grading 11.131 mi. Dunn Co., $25,876***to C. L. Lindberg, Jamestown.

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†*Federal Government.*

Streets and Roads (Continued)

bridge in Dunn Co., $10,299. Grand total $301,894. Bids Nov. 23. Noted Nov. 15.

N. D., Fargo—State Hy. Dpt., Bismarck, concrete paving 0.694 mi. road, to J. L. McCormick Constr. Co., Fargo, $55,058. Bids Apr. 13.

North Dakota—State Hy. Dpt., Bismarck, to Studer & Manion, Bismarck, grading 7.073 mi. NRS 456, $21,950***to W. Collins, Grand Forks, 9.426 mi. NRH 345CD, $26,024; 6.263 mi. NRH 429A, $15,328***to Hall & Booth, Stanley, 3.834 mi. NRS 470B, $9,468***to W. H. Noel, Jamestown, 5.203 mi. NRH 85, $31,854***to Graham Asphalt Co., Bismarck, 0.704 mi. NRM 274-B, $15,767***to J. A. Jardine Building Co., Fargo, 0.087 mi. Project 5-SE-61D, $29,350***to Rue Bros., Bismarck, concrete paving 0.522 mi. Project 403 AB-19E, $37,567***to N. W. Nursery Co., Valley City, landscaping Project 118 ABC, $986, Grand total $188,295. Bids Nov. 23.

Ohio—O. W. Merrell, dir. Hys., Columbus, hot mixed asphaltic concrete paving 0.786 mi. Sect. "Conneaut" (part) Cleveland-Buffalo Rd., and grading, draining, landscaping, concrete widening, hot mixed asphaltic concrete paving 1.509 mi. Sect. "K" (part) same road, Ashtabula Co., to Koski Constr. Co., 4624 State Ave., Ashtabula, $20,788 and $92,770 respectively***concrete paving 2.012 mi. Sect. "R" (part) Dayton-Springfield Rd., Clark Co., to Churchill, Inc., 835 East North St., Lima, $63,-997***1.095 mi. Sect. "Ironton" (part) Ohio River Rd., Lawrence Co., to W. H. Ringwald & Sons Co., 42 East 2nd St., Chillicothe, $55,784***3.078 mi. Sect. "F" (part) Delaware-London Rd., Union Co., to L. L. Clymer, Bluffton, $81,940***concrete paving 1.143 mi. hy., constructing 75 ft. span concrete bridge with steel beams, etc., over Rocky Fork Creek, at Hanover, Sects. "A" (part) "B" (part) "D" (part) and "Hanover" Newark-Coshocton Rd., Licking Co., to Green & Sawyer and Lewis & Copeland, 507 Savings Bldg., Lima, $75,978***waterbound macadam paving 0.55 mi. hy. and constructing 36 ft. span concrete beam bridge over overflow of Cuyahoga River, at Mantua, Sects. "Q" (part) and "Mantua" Painesville-Ravenna Rd., Portage Co., to Porterfield-Binger Constr. Co., 222 West Rayen Ave., Youngstown, $23,241***brick, paving, incl. furnishing, delivering brick 1.313 mi. Sects. "P-2" and "P-1" (part) Newcomerstown-Uhrichsville Rd., Tuscarawas Co., to W. M. Bode, 1st Natl. Bank Bldg., Newcomerstown, $67,983. Grand total $482,461. Bids Nov. 16.

Ohio—O. W. Merrell, dir. Hys., Columbus, grading, concrete paving 0.77 mi. (car line), and hot mixed asphaltic concrete paving 1.222 mi. Sect. "New Bremen" Piqua-St. Marys Rd., Auglaize Co., to Churchill, Inc., 835 East North St., Lima, $13,858***hot mixed asphaltic concrete paving 1.099 mi. Sect. "Willoughby" (part) Cleveland-Buffalo Rd., Lake Co., to Central Asphalt Paving Co., 307 Kahler Bldg., Canton, $32,144***concrete paving 2.341 mi. Sect. "B" (part) Delaware-London Rd., Madison Co., to L. L. Clymer, Bluffton, $54,932. Grand total $100,934. **P.W.A.** Bids Nov. 17.

Pennsylvania—At office S. S. Lewis, secy. Hys., Harrisburg, rein.-con. paving 515 ft. Route 06113, Sect. 1, Reading, Berks Co., to T. M. Flahagan, 518 Washington St., Reading, $10,-954; 1.37 mi. Route 953, Sect. 1, Co. Appls. 9651 and 9652‡ Clarks Summit and Clarks Green Boros, South Abington Twp., Lackawanna Co., to Tyler & Cole, Meshoppen, $54,205. Bids Oct. 26 and Nov. 9 respectively. **P.W.A.** Noted Oct. 18 and Nov. 1 respectively.

Pa., Kane—Black top paving, grading, filling 4,650 ft. hy. from East Kane to connect with Kane-Lamont Hy., also grading, improving athletic field at Kane High School and redecorate and drill hall and administration building at Kane Armory, day labor under supervision of B. L. Keenan, executive dir. R. W. D. $25,000. R.W.D. project approved.

Pa., Meyersdale—See "Earthwork, Irrigation, Drainage, and Waterways."

Pa., Pittsburgh—Allegheny Co., concrete paving Four Mile Run Rd., to J. H. McQuade & Sons, 4432 Milgate St., $27,071. C. M. Reppert, City County Bldg., engr.

R. I., Providence—City, F. S. Nolan, comr., bituminous macadam paving Broad St. from Public St. to Trinity Square, to John Ambrose Constr. Co., Inc., 1100 Pontiac Ave., $48,000. **P.W.A.** Bids Oct. 30, awarded Nov. 21.

South Carolina—State Hy. Dpt., Columbia, to Macdougald Constr. Co., Hemphill Ave. N.W., Atlanta Ga., bituminous surfacing 6.904 mi. U. S. Route 78 NRH 168, Orangeburg and Dorchester Counties, $80,382; 4.5 mi. NRS 384 Greenwood Co., $34,268***to J. F. Cleckley, Cope, 4.5 mi. Route 63, NRS 368, Hampton Co., $40,048***to Hubbard Constr. Co., Marion, 4.2 mi. Route 22, NRH 265, Fairfield Co., $43,600***to W. F. Bowe, Jr., 540 Reynolds St., Augusta, Ga., 6 mi. Route 163, NRS 329 C, York Co., $45,965***to C. D. Fulmer, Leesville, widening, repairing 73 ft. rein.-con. steel bridge and 181 ft. treated timber bridge on Route 163, NRS 329 B, York Co., $9,353. Grand total $253,616. **P.W.A.** Bids Nov. 20. Noted Nov. 15.

Tennessee—Dpt. Hys. & P. Wks., Nashville, grading, drainage 0.976 mi. State Hy. 3, NRH R-8-2E, Shelby Co., to A. Guthrie Co., Builders' Exch., St. Paul, Minn., $89,352***7.978 mi. Hy. 112, NRH 239-C, Cheatem Co., to M. Wunderlich, Jefferson City, Mo., $96,276*** 0.734 mi. State Ty. 56, NRS 275-D, Grundy Co., to Lebanon Bridge Co., c/o Sam Davis Hotel, Nashville, $17,937***grading, drainage, paving 0.255 mi. State Hy. 1, NRM 36-1, Shelby Co., to Carey-Reed Paving Co., 575 North Front St., Memphis, $35,755***0.313 mi. State Hy. 54, NRM 261-G, Parts 1 and 2, Weakley Co., to Bowyer & Johnson, Henderson, $21,390***grading, paving 0.298 mi. State Hy. 2, NRM 208-F, Rutherford Co., to Foster-Creighton Co., American Natl. Bank Bldg., Nashville, $33,942*** paving 2.187 mi. State Hy. 33, NRH 239-C, Monroe Co., to Pittman Constr. Co., Rhodes Bldg., Atlanta, Ga., $53,769***3.792 mi. State Hy. 18, NRH 268-D, Hardeman Co., to T. M. Strider & Co., Cotton States Bldg., Nashville, $81,138***5.236 mi. State Hy. 2, NRH 269-C, Marion Co., to Forcum-James Co., Dyersburg, $108,635***grading for roadside development 13.091 mi. State Hy. 35, NRH 248-C and E, reopened, Knox, Blount and Sevier Counties, to Garrett Bros., Ashland, Ala., $8,279. Grand total $546,473. Bids Nov. 23, awarded Nov. 26. Noted Nov. 15.

Utah—State Rd. Comn., Salt Lake City, grading, draining, placing gravel sub-base on 8.361 mi. road in San Pete Co., to L. A. Young, Richfield, $46,335. Est. $66,521. Bids Nov. 30.

Utah—State Rd. Comn., Salt Lake City, sheet asphalt repaving 2.224 mi. road in Salt Lake Co., to Gibbons & Reeds, 165 East 4th South St., Salt Lake City, $100,703. Est. $98,475. **P.W.A.** Bids Nov. 26.

Washington—L. V. Murrow, dir. Hys., Olympia, grading, crushed stone surfacing and 2 small timber trestles 4.518 mi. road Pend Oreille Co., to N. A. Degerstrom, 15 East 32nd St., Spokane, $83,690***grading, crushed stone surfacing 1.939 mi. Kitsap Co., to Halleran Bros., 2550 22nd Ave. N., Seattle, $22,008*** paving 0.492 mi. Lewis Co., to Washington Asphalt Co., 17 West Lander St., Seattle, $16,-036***asphaltic concrete paving 1.259 mi. Pierce Co., to Northwest Roads Co., P. O. Box 5072, Portland Ore., $39,772***0.555 mi. Cowlitz Co., and 0.492 mi. Whatcom Co., to Standard Asphalt Co., 603 Chronicle Bldg., Spokane, $7,588 and $14,337 respectively***constructing over crossing 0.023 mi. Whatcom Co., to Sather & Sons, 8052 15th Ave. N.E., Seattle, $6,450. Grand total $189,981. **P.W.A.** Bids Nov. 20.

Wash., Spokane — Spokane Co., improving 4.95 mi. road between Dartford and Colbert and grading, surfacing 5.51 mi. Babb Rd., west of Plaza, to Triangle Constr. Co., 1220 Ide St., Spokane, $34,401 and $36,912 respectively ***extending Salnave Rd., near Medical Lake, to C. C. Weipert Co., Clarkston, $21,457. Grand total $92,770.

Wisconsin—State Hy. Comn., Madison, concrete paving 3.808 mi. Waukesha Co., to Morris Martin Co., Berlin, $100,823***grading, draining 1.902 mi. Buffalo Co., to McLean & Hake, Superior, $66,731***2.869 mi. Lafayette Co., to J. E. Schultz, Albany, $40,697. Grand total $208,251. Bids Nov. 20. Noted Nov. 8.

Ont., Hamilton—City, straightening turns on Mountain Rd., relief labor under supervision W. L. McFaul, city engr., City Hall. $41,000. Government approved project.

EARTHWORK, IRRIGATION DRAINAGE AND WATERWAYS

PROPOSED WORK

Calif., Newport Beach—City Council received no bids Nov. 19, constructing bulkhead at entrance to channel in harbor. Will re-advertise. $18,000. R. L. Patterson, City Hall, engr.

Calif., Santa Monica—G. F. Nickolson, consult. engr., and H. B. Carter, city engr., are preparing designs for extensions to recently completed 2,000 ft. breakwater to extend total length to 5,500 ft., for City. 3 plans are being considered but that for breakwater paralleling shore has been recommended by consulting engineer. This plan would require 640,000 tons rock, est. $1,120,000; constructing groin, $10,-000; landing pier, $16,350; rebuilding Santa Monica Pier, $524,000; constructing 150x440 ft. transit shed, $132,000; dredging 235,000 cu.yd. sand, $141,000, to provide 101.7 acres of sheltered water. Total est. $1,934,350.

†Illinois—U. S. Eng., 932 Post Office Bldg., Chicago, plans deepening, widening, straightening to permit 25 foot bridge clearance and constructing new bridges as needed along Calumet River and The Sag from Chicago Drainage & Ship Canal to Lake Calumet. $21,525,750. **Maturity early in 1935.**

Tex., Donna—Donna Irrigation Dist., Hidalgo Co. Water Control & Impvt. Dist. 1, c/o H. S. Ridgeway, mgr., Donna, 60 mi. concrete lined canals. $491,000. Loan held up pending completion of refunding which is expected to be completed soon. Competitive bids. A. Tamm, Harlingen, engr. Noted Aug. 9.

Tex., Mission—Hidalgo Co. Water Control & Impvt. Dist. 6, (Goodwain Tract), c/o E. J. Walker, Mission, plans concrete lining, laying concrete pipe for irrigation, $399,000. Loan and grant practically completed after which competitive bids will be called for immediately. E. M. Card, 1310 Chicago St., McAllen, engr.

Ont., Brantford—Commission Grand River Conservation, plans approved by Provincial Government, for Grand River Conservation Scheme, and is assuming 2/3 of the labor costs. A series of dams is proposed to prevent spring flood and control water for sewage disposal and other purposes. $700,000. T. Hogg, c/o Hydro-Electric Comn., Toronto, engr.

BIDS ASKED

Calif., San Jose—Dec. 14, by Directors Santa Clara Valley Water Conservation Dist., Grant Bldg., Stevens Creek Dam and Spillway, involving earthfill structure with concrete facing on upstream side, 600 ft. long at crest, maximum height 100 ft., $415,000; constructing Almaden Dam, Almaden Spillway, Almaden-Calero Conduit, Calero Dam, Calero Auxiliary Dam and Calero Spillway and appurtenant works, dams are earth fill type with upstream face concrete paved, the Almaden Dam will have crest of 500 ft., maximum elevation 90 ft., $214,000; Calero Dam, 900 ft. wide at crest, maximum height 93 ft., to cost $339,000. F. H. Tibbetts, Alaska Comm. Bldg., San Francisco, engr. Noted Sept. 27.

†Ill., Chicago—Dec. 29, by U. S. Eng., Post Office Bldg., Chicago, constructing passing-places immediately west of 96th Ave., east of Ridgeland Ave. and east of Crawford Ave. on south bank of Calumet Sag Channel, west of Blue Island, incl. 1,276,200 cu.yd. common and 250,100 cu.yd. rock excav., 61,600 cu.yd. rip rap; adv. E.N.-R. Dec. 6. Noted Nov. 1.

†Minn., Winona—Dec. 20, by U. S. Eng., 615 Commerce Bldg., St. Paul, constructing Dam 6A, in Mississippi River, near here.

Nebraska—Dec. 12, by Platte Valley Power & Irrigation, North Platte, furnishing 8 Skiimer Weir Gates with frames, guides and operating machinery, for work in Keith Co., delivered to Roscoe. D. D. Price, North Platte, ch. engr.

Neb., North Platte—Dec. 14 (extended date), by D. D. Price, secy., Platte Valley Public Power & Irrigation Dist., 2 vertical shaft Francis turbines and governors of actuating type delivered at Union Pacific Station, here, for Sutherland Project. Noted Nov. 22.

†New York—Dec. 10, by U. S. Eng., 2nd Dist., 39 Whitehall St., New York, dredging 222,000 cu.yd. material in entrance channel to Great Kills, Staten Island; adv. E.N.-R. Dec. 6.

†N. Y., Port Chester—Dec. 18, by U. S. Eng., Army Bldg., 39 Whitehall St., New York, dredging 10,830 cu.yd. in Port Chester Harbor; adv. E.N.-R. Dec. 6.

†O., Zanesville—Dec. 10, by U. S. Eng., Zanesville, foundation investigations for Pleasant Hill Damsite, on Clear Fork, about 3 mi. south of Perrysville and 5 mi. southwest of Loudenville.

Tex., Freeport—Dec. 27, by Brazos River Harbor Navigation Dist., E. C. Toby, chn., 1 and 2 story, frame, rein.-con. wharves and warehouses, two 200x300 ft. cotton sheds, 120x 400 ft. pier sheds, 880 ft. wharves. P.W.A. project. $550,000. R. J. Cummins, Bankers Mortgage Bldg., Houston, engr. Noted Nov. 22.

Washington—See "Streets and Roads."

CONTRACTS AWARDED

Calif., La Mesa—La Mesa Spring Valley & Lemon Grove Irrigation Dist., C. Harritt, ch. engr., constructing concrete, steel pipe line to by-pass water in old flume and around new pipeline, to American Concrete & Steel Pipe Co., 4635 Firestone Blvd., Los Angeles, $54,717, **P.W.A.** Bids Nov. 17, awarded Nov. 17. Noted Nov. 8.

†Louisiana—U. S. Eng., Prytania St. and River Front, New Orleans, constructing 154,000 cu.yd. drainage canals above Bonnet Carre Spillway Upper Guide Levee, to J. L. McWilliams, 308 New Orleans Bldg., New Orleans, 9.9c. per cu.yd. Bids Nov. 30. Noted Nov. 22.

†Mississippi — U. S. Eng., P. O. Box 97, Memphis, Tenn., 54,000 cu.yd. earthwork for new spur levee at Friar Point, in Upper Yazoo Levee Dist., to F. L. Abernethy, Lake Cormorant, at 16.47c. per cu.yd. Bids Nov. 26.

†Mo., Canton—U. S. Eng., Rock Island, Ill., remedial works at Lock and Dam 20, Mississippi River, near here, to Perry McGlone Co., 300 City Bank Bldg., Kansas City, $158,704. Bids Oct. 31.

Nebraska—Loup River Public Power Dist., C. B. Fricke, pres., Columbus, 2,500,000 cu.yd. earth excav. over 13 mi. canal from Station 50 plus 00 to Station 540 plus 00 in neighborhood between Genoa and Monroe, to W. S. Hardwick Constr. Co., Memphis, Tenn., $167,840. (**Correction**—name of owner). Bids Oct. 19. Noted Nov. 22, under "Contracts Awarded."

†Nevada—Bureau Reclamation, Denver, Colo., constructing Rye Patch Dam, Humboldt Project, to J. A. Tertelling & Sons, Boise, Idaho, $256,-322. Bids Nov. 12. Noted Oct. 25.

†W. Va., Grafton—U. S. Eng., Pittsburgh, Pa., constructing Tygart River Dam, near here, to Frederick Snare Corp., 114 Liberty St., New York, N. Y., $6,305,733. Bids Oct. 16. Noted Nov. 1.

Wis., Milwaukee—Bd. Harbor Comrs., constructing steel sheet bulkhead along westerly side of old incinerator plant, to E. E. Gillen Co., 626 East Wisconsin Ave., Milwaukee, $24,-398. Bids Nov. 19, awarded Nov. 22.

†Federal Government.

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Earthwork, etc. (Continued)

Ont., Prescott—Secretary Dpt. P. Wks., Ottawa, constructing new dock, to R. A. Blyth Constr. Co. Ltd., 164 Indian Rd. Cres., Toronto. Est. $45,000. Bids Nov. 2.

UNCLASSIFIED

PROPOSED WORK

Calif., Santa Monica—ORNAMENTAL LIGHTING SYSTEM—City Council requested Bd. Supervs. to appropriate $48,274 for installation of ornamental lighting system in Ocean Ave., from Colorado St. to northwest city limits. H. B. Carter, City Hall, engr.

Louisiana—OIL PROPERTY DEVELOPMENT—Win or Lose Oil Co., c/o Senator Jas. A. Noe, pres., Baton Rouge, plans driving wells on state-owned lands on a royalty basis, involving drilling 50 wells, etc., at various locations.

Maine—FERRY PIER—Town of Islesboro, c/o R. L. Frnald, Winterport, plan ferry pier between Islesboro and Lincolnshire. $75,000. Will probably be state and town project.

†**Mass., South Boston**—AIRPORT—Dpt. Commerce, Air Navigation, Municipal Airport, Boston, plans fill, roadways and new entrance at South Boston Airport.

Ohio—RAILROAD TRACK RELOCATION—Pennsylvania R.R., Broad St. Station, Phila., Pa., T. J. Skillman, ch. engr., plans relocating 10 mi. track in Muskingum Valley, Central Ohio.

Ohio—TRACK RELOCATION—Baltimore & Ohio R.R., H. A. Lane, ch. engr., Baltimore, Md., plans relocating about 20 mi. track, Muskingum Valley, Central Ohio.

Pa., Erie—RADIO BROADCASTING STATION—L. J. Omelian, 436 West 12th St., plans complete radio broadcasting station, antenna, etc. Applied to Federal Radio Comn. for permission to construct plant to operate on 1420 kilocycles at 100 watts in daytime and 250 watts power at night. $20,000. **Maturity at once.**

Pa., Phila. — HIGH SPEED LINE EQUIPMENT BUILDINGS—Delaware River Joint Comn., at office of Joint Comn., Administration Bldg., Bridge Plaza, Camden, N. J., rejected bids for Constr. 7-B building in Camden, N. J., to house sub-station equipment for high speed rail transit line. Turner Contr. Co., Phila., was low bidder for Contr. 7-A, building in Phila., to house sub-station equipment for high speed rail transit line, no action on ward. Noted Nov. 1.

Tex., Houston—GAS SYSTEM—City, c/o O. F. Holcombe, mayor, rejected bids Nov. 21, gas plant improvements. Will probably readvertise soon. $92,000. P.W.A. project. Noted Nov. 15.

B. C., Vancouver—BATH HOUSE—Election Dec. 12, $25,000 for outdoor bath scheme C. Brakenridge, engr.

Ontario—GAS PIPE LINE—South Ontario Gas Co., Leamington, plans gas pipe line from Glenwood to Leamington. $65,000.

BIDS ASKED

Mass., Lowell — AIRPORT — See "Contracts Awarded."

N. Y., New York—LADDERS and GRATINGS—Dec. 21, by Bd. Transportation, J. H. Delaney, chn., 250 Hudson St., furnishing, installing ladders and gratings for ventilation equipment, Independent City-owned Rapid Transit Railroad System, Fulton St. to 207th St., Manhattan Boro.

Pa., Du Bois — AIRPORT — See "Contracts Awarded."

CONTRACTS AWARDED

Calif., Richmond—WHARF—Standard Oil Co. of Calif., 225 Bush St., San Francisco, wharf extension, to Lindgren & Swinerton, 225 Bush St., San Francisco. $100,000.

Mass., Lowell—AIRPORT—City, J. J. Bruin, mayor, airport development, day labor under E.R.A. Est. $170,000. Noted Dec. 7.

New York—TRACKS and CONTACT RAIL—Bd. Transportation, J. H. Delaney, chn., 250 Hudson St., New York, installing tracks and contact rail for Madison & Rutgers Sts., Manhattan Boro, under East River, to Jay to Chapel Sts., Brooklyn Boro, to B. T. and J. J. Mack, Inc., 160 Bway., New York. $57,520. Bids Oct. 30. Noted Oct. 18.

N. Y., Brooklyn—CONNECTIONS and TRACK—Bd. Transportation, J. H. Delaney, chn., 250 Hudson St., New York, furnishing, installing D.C. connections and track bonding from Rockaway Ave. to Court St. and from South Oxford to Smith Sts., to B. T. and J. J. Mack, Inc., 160 Bway., New York. $129,900. Bids Oct. 23. Noted Oct. 11.

N. Y., Syracuse — SIGNAL STATION — New York Central R.R. Co., J. W. Pfau, ch. engr., 466 Lexington Ave., New York, constructing 2 story, 16x70 ft. signal station for grade crossing elimination, to W. Ballard & Son, City Bank Bldg., Syracuse. Est. $25,000. Bids Nov. 13, awarded about Nov. 18.

†*Federal Government.*

Pa., Du Boise—AIRPORT—City, developing modern airport for municipality, day labor under supervision of City Engineering Dpt. Est. $40,000. RWD project approved. $2,000 allotted for materials. **Maturity at once.**

Pa., Kutztown—ATHLETIC FIELD, etc.—See "Sewerage and Waste Disposal."

Ont., Sault Ste. Marie — FLOATING DRY DOCK—A. B. McLean & Sons, (towing dredging) plans to start work about Dec. 1, on 150 ft. long, 60 ft. beam, 28 ft. deep floating drydock, furnishing 250,000 ft. Douglas fir lumber, to Soo Lumber Co., North St.

Que., Montreal—RAILWAY TRACKS, etc.—Montreal Harbor Comn., railway tracks, embankments between Imperial Oil and Marien St. Wharf, Montreal East. Sects. 101 to 110, to H. J. O'Connell, Ltd., 606 Cathcort St., Montreal, at 73c. per cu.yd. Est. $75,000.

MATERIALS AND EQUIPMENT

PROPOSED WORK

MOTOR TRUCK—**Sacramento, Calif.**—City plans purchasing 1½ ton motor truck for Fire & Police Dpt. H. G. Denton, city clk.

TRUCKS—**Hartford, Conn.**—City, Street Bd., plans purchasing 3 ash and rubbish collection aluminum truck bodies. R. B. Posey, dir. Research.

METERS, etc. — **Richmond, Ind.** — Municipal Lighting & Power Co., D. C. Hess, supt., appropriates $40,300 funds for 1935 material and equipment, incl. meters, transformers, short extensions, sundry equipment for underground construction.

TANKS—**St. Louis, Mo.**—S. J. Dielschneider, c/o 7153 Lansdowne Ave., applied for permit to install two 1,000 gal. underground steel tanks for gasoline, pumps, etc., for automobile filling station, at 7153 Lansdowne Ave.

TANKS—**St. Louis, Mo.**—T. C. Ruhaack, 2632 Texas Ave., granted permit to install three 1,000 gal. underground steel tanks for gasoline at automobile filling station, 4723 Hampton Ave.

TANKS—**St. Louis, Mo.**—Square Deal Oil Co., 9339 Easton Ave., granted permit to install 3 underground steel gasoline tanks at automobile service station, 624 South Bway.

SNOW PLOW—**Lakewood, N. Y.**—Village Bd., J. W. Wolfe, clk., plans purchasing motor driven snow plow. To exceed $1,000.

TRUCKS — **Waterloo, N. Y.** — Bd. Supervs. Seneca Co., plans trucks for County Hy. Dpt. $7,000. **Maturity early in 1935.**

†PILING, CEMENT—**Washington**—Bureau Reclamation, Almira, soon takes bids 25,000 tons steel sheet piling for cofferdam diversion of Columbia River, Grand Coulee Dam Project; bids about Jan. 1, for cement.

TANKS—**Hull, Que.**—Amherst Oil Refining Ltd., Reboul St., interested in prices for supply of and erection of two 8,400 bbl. tanks. Site purchased.

BIDS ASKED

GRAVEL, etc.—**Indiana**—Dec. 11, by J. D. Adams, chn. State Hy. Comn., Indianapolis, 500-1,000 tons plant run gravel loaded into state trucks at bin near Rds. 52 and 9; 500-1,000 tons, loaded into state trucks on Rd. 52, near Arlington; 800-1,000 tons, delivered on various roads in Greenfield Dist.; 2,000-2,500 tons No. 45 maintenance stone, f.o.b. Wingate; 500 tons No. 4 crushed aggregate, f.o.b. Monticello.

†OIL ENGINE—**Duluth, Minn.**—Dec. 12, by U. S. Engr., Canal Park, multiple-cylinder oil engine complete with accessories.

HAULING GRAVEL, etc—**Jackson, Miss.**—Dec. 18, by E. D. Kenna, dir. State Hy. Comn., Jackson, furnishing for period beginning Jan. 26, 1935, and ending July 25, 1935, of Jan. 25, 1936, hauling gravel in various maintenance divisions and furnishing gravel and sand, crushed aggregate and slag, treated lumber and piling, bituminous materials, paints, tires and tubes, motor oils, lubricating oils and transmission greases; gasoline and kerosene, signs and road markers and sign posts. $12,000. R. A. Harris, Jackson, engr.

MOTOR GRADERS—**Raleigh, N. C.**—Dec. 12, by Div. Purchase & Contr., A. S. Brower, dir., 15 motor graders complete with scarifier. $3,000 each.

TRUCKS—**Raleigh, N. C.**—Dec. 12, by Div. Purchase & Contr., A. S. Brower, dir., 15 four-wheel drive trucks complete with cabs. $3,000 **each.**

TANKS—**Montreal, Que.**—Harry Noble & Son, 2453 Rozel St., in market four 500 gal. gasoline tanks.

CONTRACTS AWARDED

CAST IRON PIPE—**Huntington Park, Calif.**—City Council, furnishing 525 ft. 12 in. and 4,800 ft. c.i. pipe, to National Cast Iron Pipe Co., 625 South Western Ave., at $1.63 and 95c. per ft. respectively•••fourteen 8 in. gate valves, to Hickey Pipe & Supply Co., 3375 East Slauson Ave., at $36.96 each•••fourteen 6 in. hydrants, to Rensselaer Valve Co., 417 South Hill St., at $57 each•••sixteen 6 in. gate valves to Rich Mfg. Co., 3851 Santa Fe Ave., at $23.52 each•••four 4 in. valves, to Chapman Valve Co., 1725 East 7th St., at $12.88 each. Noted Nov. 1.

AUTO OSCILLOGRAPH—**Los Angeles, Calif.**—D. P. Nicklin, purch. agt. Dpt. Water & Power, 207 South Bway., furnishing, delivering 1 high speed auto oscillograph to be installed in receiving station for power system fault study, Spec. 1546, to General Electric Co., 5201 Santa Fe Ave., $2,121. Bids Nov. 7, awarded Nov. 20.

LIGHTNING ARRESTERS — **Los Angeles, Calif.**—D. P. Nicklin, purch. agt. Dpt. Water & Power, 207 South Bway., furnishing 12 lightning arresters, 3 pole station type, outdoor 3 phase solidly grounded, neutral systems, voltages specified. Spec. 1529, to Westinghouse Electric & Mfg. Co., 420 South San Pedro St., $34,966 Bids Oct. 31, awarded Nov. 20.

NEW TRACK MATERIAL, etc.—**Los Angeles, Calif.**—D. P. Nicklin, purch. agt. Dpt. Water & Power, 207 South Bway., furnishing, delivering 690 gross tons 40 lb. tee rail, standard A and CE, erection and drilling, 3,945 pr. angle splice bars, notched, punched, to fit above rail, 55 kegs (200 lbs. each) ¾ in. x 3 in. standard track bolts, 280 kegs (200 lbs. each) ¾ in. x 5 in. standard track spikes, Spec. 1550, and furnishing turnouts to United Commercial Co., 837 East Gage St., estimated cost $20,000 and $4,546 respectively.

LIFT TRUCK—**Oakland, Calif.**—City Port Comn., furnishing 3-ton lift truck, to I. G. Perin, 200 Davis St., San Francisco, $2,305. Bids Oct. 29, awarded Nov. 21.

PIPE, etc.—**Oakland, Calif.**—East Bay Municipal Utility Dist., 312 16th St., furnishing c.i. flanged pipe and fittings, Proposal LS-132, incl. eighteen 20 in. flanged ball and socket flexible joints, to Pacific Coast Eng. Co., foot of 14th St., $3,942•••2 lengths, 20 in. diam. Class D flanged pipe 5 ft. long, to American Cast Iron Pipe Co., Sharon Bldg., San Francisco, $146•••four 20 in. 37 degree flanged short radius elbows and six 20 in. flanged expansion joints, to Phoenix Iron Wks., 2nd and Castro Sts., $240 and $1,050 respectively•••thirty-four lengths 20 in. diam. Class D flanged pipe, to U. S. Pipe & Fdry. Co., Monadnock Bldg., San Francisco, $2,886. Grand total $8,264.

GENERATOR—**Chicago, Ill.**—Dpt. P. Wks., City Hall, 1 steam driven turbine generator, 75 kw., to General Electric Co., 20 North Wacker Dr., $6,185. Awarded Nov. 27.

LUMBER—**Chicago, Ill.**—Dpt. P. Wks., City Hall, zinc chloride treated yellow pine lumber for bridge work, to Wood Preserving Corp., 80 East Jackson Blvd., $2,090; fir lumber treated with triolith salts, to Joslyn Mfg. & Supply Co., 20 North Wacker Dr., $5,750. Awarded Nov. 27. Noted Aug. 16.

†ROOFING MATERIALS & ASPHALT — **Montana**—U. S. Eng., Postal Telegraph Bldg., Kansas City, Mo., furnishing roofing material and asphalt for garage at Fort Peck Dam, to Grogan-Robinson Lumber Co., Great Falls, $1,006. Bids Nov. 23, awarded Nov. 27.

SCREENS, etc.—**Chicago, Ill.**—Dpt. P. Wks., City Hall, fabricating, delivering screens, guiders, ladders, steel work, sheaves, pump retainer, pipe and c.i. manholes, to Hansell Elcock Co., 3153 Archer Ave., $4,875. Bids Nov. 14, awarded Nov. 27.

DRAG BLADES, etc.—**Iowa**—State Hy. Comn., Ames, 10,300 lin.ft. drag and 19,250 ft. grader blades, to Haight Tractor & Equipment Co., 1314 Walnut St., Des Moines, $16,293. Bids Nov. 19, awarded Nov. 19. Noted Nov. 15.

CREOSOTED PILING, etc.—**Nevada, Ia.**—Story Co., 2,820 lin.ft. creosoted bridge piling, 5,400 ft. BM creosoted bridge stringers, 48,000 ft. BM rought fir bridge plank, to W. W. Horras, Nevada, $4,418; 82,000 lb. I-beam steel, to Rosenbaum & Son, Centerville, $1,976. Bids Nov. 22.

SEWER CASTINGS — **Boston, Mass.** — City, Supply Dpt., W. W. Loomis, supt., City Hall Annex, miscellaneous sewer castings, to Sewer Dpt. to Mechanics Iron Fdry. Co., 38 Kemble St., Roxury, $4,200. Bids Nov. 7, awarded Nov. 23.

†LONG LEAF YELLOW PINE LUMBER—**Vicksburg, Miss.**—U. S. Eng., P. O. Box 67, furnishing, delivering 32,600 ft. B.M. long leaf southern yellow pine lumber, f.o.b. Greenville, to J. E. Paterson Lumber Co., Tacon Station, Mobile, Ala., $1,704. Bids Nov. 20.

†WIRE ROPE, etc.—**Vicksburg, Miss.**—U. S. Eng., 1,800 lin.ft. wire rope, to E. C. Bowers, and C. L. Feldman as trustees for Wickwire Spencer Steel Co., 41 East 42nd St., New York, N. Y., $551. Bids Nov. 20, and 100 No. 11 gage, 3¼ in. diam. 16 ft. long boiler tubes, to Vicksburg Boiler & Iron Wks., Depot St., $519. Bids Nov. 19.

†GAS BURNING FURNACE — **Montana** — U. S. Eng., Postal Telegraph Bldg., Kansas City, Mo., gas burning furnace and accessories, f.o.b. Wiota, to American Fdry. & Furnace Co., Bloomington, Ill., $896. Est. $1,500. Bids Nov. 19, awarded Nov. 22.

†STEEL—**Montana**—U. S. Eng., Kansas City, Mo., steel for 150x150 ft. garage at Fort Peck Dam, to St. Joseph Structural Steel Co., 8th

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Materials, etc. (Continued)

and Atchison Sts., St. Joseph, Mo., $5,797. Est. $8,000. Bids Nov. 13, awarded Nov. 23.

†SUCTION PIPES—**Montana**—U. S. Eng., 707 Postal Telegraph Bldg., Kansas City, Mo., ladder well suction pipes for Fort Peck Dam, to Omaha Steel Wks., 609 South 48th St., Omaha, Neb., $2,544. Bids Nov. 16, awarded Nov. 22.

†SUCTION PIPE—**Montana**—U. S. Eng., Postal Telegraph Bldg., Kansas City, Mo., suction pipes on ladder, 4 lots, to Treadwell Constr. Co., Midland, Pa., $2,470. Est. $4,500. Bids Nov. 21, awarded Nov. 26.

†SUCTION SWIVEL ELBOWS — **Montana** — U. S. Eng., 707 Postal Telegraph Bldg., Kansas City, Mo., suction swivel elbows for Fort Peck Dam, to Penn Steel Castings Corp., Front and Penn Sts., Chester, Pa., $7,398. Est. $5,000. Bids Nov. 17, awarded Nov. 24.

TANKS — **Jamestown, N. Y.** — Superior Oil Wks., H. Eaton, mgr., three 18,000 gal. steel tanks, to Hammond Iron Wks., Warren, Pa. Noted Nov. 22.

WATER PIPE, etc.—**Lakewood, N. Y.**—Village, J. W. Wolfe, clk., 3,800 lin.ft. 4 in. bell and spigot water pipe, to U. S. Cast Iron Pipe & Fdry. Co., 71 Bway., New York, $1,862••• 4 hydrants, to Ludlow Mfg. Co., 11 West 42nd St., New York, $49.44 each•••3,000 lb. caulking lead, to M. Hayman Co., Chicago, Ill., at $3.90 per 100 lbs. Noted Nov. 19 Daily.

CONTACT RAIL PROTECTION BOARDS—**New York, N. Y.**—Bd. Transportation, J. H. Delany, chn., 250 Hudson St., untreated contact rail protection boards, to Berry-Rives Lumber Co., Inc., 831 1st St., Fort Myers, $36,193. P.W.A. Bids Aug. 23. Noted Aug. 16.

FIRE ALARM BOXES—**Montreal, Que.**—City Executive, installing 71 fire alarm boxes, to W. E. Baker Electric Engineering Co., Ltd., 4010 St. Catharine St. W., $11,715.

FOREIGN

Australia—Finance Ministry, **Canberra**, preparing plans for National University, $3,000,000 appropriated•••**Brisbane** City and State Government preparing plans and takes bids in January, water supply and flood prevention works on Stanley River $8,750,000, also river improvements $2,500,000.

Bahama Islands, Nassau—Pan American Airways, 135 East 42nd St., New York, plans airport development, at Eastern Parade. To exceed $150,000. Project is dependent upon securing satisfactory site from government.

British South Africa—British Burmah Petroleum Co., c/o Bureau of Commerce, Government of British Capetown, plans oil refinery, $500,000.

Dutch West Indies—Standard Oil Co. of New Jersey, 30 Rockefeller Plaza, dredging at Aruba, to Standard Dredging Co., 80 Broad St., New York, est. $250,000; piling work, to Raymond Concrete Pile Co., 140 Cedar St., New York.

England—Neath Rural Council instructs City Architect to prepare plans for erecting 250 houses, $368,750•••Standing Joint Committee, **Surrey**, voted $750,000 for constructing 200 police houses, tenders in January•••W. Holly, Woodham Grange Farm, preparing plans constructing 1,087 houses in **Chertsey**, to exceed $2,000,000•••Bedfordshire Public Assistance Commission, voted $600,000 for addition to hospital in **Lutam**•••Essex Education Committee votes $650,000 for erecting technical school in **Walthamstow**.

Italy—Italian Government, Rome, short wave radio broadcasting station, studio, etc., at Prato Smeraldo Station, separate contracts awarded. Est. about $500,000.

Union Socialist Soviet Republics—Commissariat of Heavy Industry, Soviet Government, Moscow, or c/o Amtorg Trading Corp., 261 5th Ave., New York, automatic machine tool plant, by day labor. To exceed $1,000,000.

Union Socialist Soviet Republics—Cotton Trust, Soviet Government, Moscow, or c/o Amtorg Trading Corp., 261 5th Ave., New York, cotton ginning plant, 44,000 tons Egyptian cotton capacity, at Salianikh, Province of Azerbardzhan, by separate contracts. $2,000,000.

Union Socialist Soviet Republics—Dpt. Mining, c/o Commissariat of Heavy Industry, Moscow, or c/o Amtorg Trading Corp., 261 5th Ave., New York, plans mining, milling and smelting plant for zinc and lead ores, in Donbas Region. To exceed $500,000. **Maturity later.**

Union Socialist Soviet Republics—Dpt. Rail Transportation, Soviet Government, Moscow, or c/o Amtorg Trading Corp., 261 5th Ave., constructing double tracking 4,500 mi. Trans-Siberian Railway, from Sverdlovsk in Ural Mountains to Vladwostak.

Union Socialist Soviet Republics—Municipality, c/o Soviet Government,Moscow, or Amtorg Trading Corp., 261 5th Ave., New York, constructing 6 large municipal apartment houses, 10.5 kilometers water mains, 5 kilometers sewage mains, 8.5 kilometers lighting distribution extension, 4 kilometers additional traction lines, 5 schools, 2 hospitals and 1 hotel, at Gorlovka, Donetz Basin, by day labor. To exceed $500,000.

Union Socialist Soviet Republics — Soviet Government, Moscow, or c/o Amtorg Trading Corp., 261 5th Ave., New York, medical center and hospital, Bokhara Oasis, Central Asia, by day labor. $500,000.

PUBLIC BUILDINGS

PROPOSED WORK

Calif., Fresno—Municipality received offer of National Eng Co., engrs., 4573 West Pico Blvd., Los Angeles, to construct electric power plant and distribution system and take revenue bonds to be paid from earnings as payment.

Calif., Montebello—Montebello School Dist. defeated $900,000, for school. T. C. Kistner, 814 Architects Bldg., Los Angeles, archt. Noted Oct. 18.

Calif., San Jose—State plans fireproof, rein.-con. miscellaneous buildings at State Teachers College Grounds. $350,000 or more. State Dpt. P. Wks., Div. of Architecture, P. Wks. Bldg., Sacramento, archt.

Ind., Hammond — School Comrs. plans completed by J. T. Hutton & Sons, 5031 Homan Ave., 2 story, basement, brick, rein.-con., stone school. $500,000. P.W.A. project.

Maryland—Bd. Educ., Baltimore Co., Courthouse, Towson, takes bids early part of 1935, altering and constructing 2 story, basement addition to school, Catonsville, $75,000; also 2 story, stone school, 10th Dist., Baltimore Co. $60,000. Smith & May, Baltimore Trust Bldg., Baltimore, archt. Noted Oct. 25.

†Md., Belair — Treas. Dpt. at office Sup. Archt., Wash., D. C., bids early in 1935, 1 story, basement U. S. Post Office. $75,000.

Md., Cumberland—Allegheny Co. Bd. Educ., South Centre St., received no bids Nov. 23, for 3 story, basement Junior-Senior High School. $750,000. C. L. Kolp, supt. schools. Noted Nov. 15.

†Md., Harve de Grace—Treas. Dpt. at office Sup. Archt., Wash., D. C., bids early in 1935, 1 story, basement U. S. Post Office. $75,000.

Mass., Boston—Commonwealth of Massachusetts, Metropolitan Dist. Comn., D. B. Keniston, comr., 20 Somerset St., Boston, making plans 1 story, brick, concrete, stone bathhouse, Spring St., West Roxbury. $20,000-$30,000.

†Mass., Milton—Treas. Dpt. at office Sup. Archt., Wash., D. C., plans U. S. Post Office. Bids Nov. 23 for site.

Mich., Traverse City—Bd. Educ., plans by Knecht, McCarty & Thebaud, Grand Rapids, 2 story, basement, brick, steel, stone, rein.-con. school, plain found., Central School site. $250,000.

Missouri—State Building Comn., Jefferson City, C. S. Haskins, superv. archt. and engr., and E. S. Klein and L. R. Bowen, superv. engrs., approved construction of the following buildings for which plans will be prepared at once: 2 dormitories for employes at State Hospital 2 for Insane, St. Joseph, $100,000 each; 2 dormitories for employes at State Hospital 3 for Insane at Nevada, $100,000 each; power house at Missouri State School for Feeble-Minded at Marshall, $150,000; addition to Hyde Building at State Hospital 1 for Insane at Fulton, $70,000; new wing for Lloyd Building at Missouri State Sanitarium for Tuberculosis at Mount Vernon, $20,000; dining room addition at State Hospital 4 for Insane at Farmington, $19,000; 6 dormitories for Intermediate Prison at Algoa Farms, North Jefferson City, $339,000. Noted Aug. 24.

†Neb., Nebraska City—Federal Emergency lief Administration, plans equipping plant for tanning and curing hides in former meat packing house, $55,000. R. Haynes, Lincoln, agent in charge of project.

Nev., Winnemucca—See "Waterworks."

N. J., Chatham—Bd. Educ. defeated bonds constructing school, $386,000. Will apply for P.W.A. loan under different conditions. $386,000. W. A. Pieper, Chatham, archt. Noted Oct. 8.

†N. M., Gallup—Indian Bureau, Wash., D. C., soon takes bids constructing Indian Capitol, incl. auditorium, water supply, day schools, and miscellaneous headquarter building, near here. $950,000.

†N. Y., Amsterdam—Treas. Dpt. at office Sup. Archt., Wash., D. C., soon takes bids brick, steel U. S. Post Office, plain found., Church St. $310,000.

†N. Y., Brooklyn—Treas. Dpt. at office Sup. Archt., Wash., D. C., plans by L. Rich, 101 Park Ave., New York, 1 and 2 story, part basement, brick, limestone post office, Church Ave. between Bedford and Flatbush Aves. $94,500. Noted June 21.

N. Y., Haverstraw—Bd. Educ. bids late in December, school. Knappe & Morris, 192 Lexington Ave., New York, archts. Noted Sept. 20.

†N. Y., New York—Treas. Dpt. at office Sup. Archt., Wash., D. C., bids after Jan. 1, constructing Morris Heights Postal Station, Jerome Ave. near Burnside Ave. $117,000.

†N. Y., New York—Treas. Dpt. at office Sup. Archt., Wash., D. C., bids after Jan. 1 constructing College Branch Postal Station, West 140th St. $264,000. Site not selected.

N. Y., New York—Dpt. Parks, Arsenal Bldg., Central Park, plans by A. Embury, c/o owner, 2 story, 49x169 ft. club house, Shore and Split Rock Rds. $306,000.

†N. Y., New York—Treas. Dpt. at office Sup. Archt., Wash., D. C., bids early in 1935, constructing Post Office Station T, Park Ave. and 167th St. $106,000. Site selected.

†N. Y., Oswego—Treas. Dpt. at office Sup. Archt., Wash., D. C., made plans and soon takes bids 2 story, basement, brick, steel post office, plain found., $125,000.

N. Y., Troy—City bids in spring Junior High School, brick, steel, plain found., $450,000. W. E. Clark, Cannon Bldg., Troy, archt. P.W.A. project. Noted Apr. 5.

O., Wooster—Bd. Trustees Wooster College, Dr. C. F. Wisehart, pres., sketches by D. E. Waid, 1 Madison Ave., New York, and soon takes bids 3 story, basement girls' dormitory, stone, brick, concrete, Beall Ave. $175,000.

R. I., Exeter—State, Dr. F. J. Farbell, chn. State Welfare Comn. of Emergency P. Wks. Comn., State House, Providence, rejected bids for hospital at State Institution. J. F. Hogan, 315 Grosvenor Bldg., Providence, archt. Will revise plans for same. Noted Nov. 5 Daily.

R. I., Kingston—State, Rhode Island State College, State House, soon takes bids 4 story, basement, 54x253 ft., brick, steel women's dormitory. $350,000. P.W.A. project. A. Harkness, 1428 Industrial Trust Bldg., Providence, archt. Noted Dec. 21.

R. I., Kingston—State, State College, plans being completed by Monahan & Meikle, 255 Main St., Pawtucket, and soon takes bids 3 story, brick, stone science unit at State College. $300,000. P.W.A. project.

R. I., Pawtucket—City, School Bd., plans high school, Sayles Plot. $1,000,000. Architect not appointed.

Tex., Austin—R. L. White, archt., 302 East 26th St., soon lets contract 4 story, basement, 135x182 ft., rein.-con., steel, marble, granite library (completion) for University of Texas Bd. Regents, c/o B. Jester, chn., and J. W. Calhoun, comptroller. $1,800,000. P. P Cret, Architects Bldg., Phila., Pa., consult. archt. R. O. Jameson, S. W. Life Bldg., Dallas, consult. engr. R. F. Taylor, 4301 Main St., Houston, plumbing, heating and electrical engr. Noted Nov. 1, under "Bids Asked."

Utah, Ogden—Weber Co. School Dist. defeated $200,000 for school. M. C. Wood, Eccles Bldg., archt. Noted Sept. 6.

Wash., Seattle—Bd. Control of Associated Students of University of Washington, plans Athletic Pavilion Wing, incl. men's swimming pool, handball courts, faculty gymnasium. $250,000-$400,000.

B. C., Vancouver—City, City Hall, election Dec. 12, $500,000, new monolithic concrete city hall. Competition plans from British Columbia architects will be called if bonds are voted. Noted Sept. 13.

Que., Montreal—City Engineer preparing plans municipal power house on aqueduct canal. $3,000,000.

Sask., Saskatoon—Dpt. Agriculture purchased 640 acres land and plans winter construction of necessary buildings for Melfort Experimental Farm.

BIDS ASKED

†Ala., Brewton—Jan. 3, by Treas. Dpt. at office Sup. Archt., Wash., D. C., constructing U. S. Post Office. Noted Sept. 6.

†Ala., Fairfield—Dec. 28, by Treas. Dpt. at office Sup. Archt., Wash., D. C., constructing U. S. Post Office; adv. E.N.-R. Dec. 6.

†Ark., Osceola—Jan. 2, by Treas. Dpt. at office Sup. Archt., Wash., D. C., constructing U. S. Post Office.

†Calif., South Pasadena—Jan. 9, by Treas. Dpt. at office Sup. Archt., Wash., D. C., constructing U. S. Post Office. Noted July 13, 1933.

†Calif., Turlock—Jan. 7, by Treas. Dpt. at office Sup. Archt., Wash., D. C., constructing U. S. Post Office.

†Del., New Castle—Dec. 21, by Treas. Dpt. at office Sup. Archt., Wash., D. C., constructing U. S. Post Office.

†D. C., Wash.—Dec. 21, by Treas. Dpt. at office Sup. Archt., Wash., D. C., interior lighting fixtures.

†Ga., Atlanta—Dec. 20, by Housing Div., Headquarters, Federal Emergency Administration, Wash., D. C., constructing Techwood Project, incl. three groups 2 story row buildings, thirteen 3 story apartment buildings, 7 courts of row houses, dormitory, store, administration building and playground shelter or loggia. $2,700,000. P.W.A. allotment.

†Ga., Atlanta—Dec. 28, by Treas. Dpt. at office Sup. Archt., Wash., D. C., remodeling U. S. Post Office and Court House. Noted Mar. 1.

†Ga., Winder—Dec. 27, by Treas. Dpt. at office Sup. Archt., Wash., D. C., constructing U. S. Post Office.

Ill., Jacksonville—Dec. 18, by State Dpt. P. Wks. & Buildings, Capitol Bldg., Springfield, constructing school for deaf. $180,000. P.W.A.

†*Federal Government.*

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Public Buildings (Continued)

project. C. H. Hammond, Springfield, state superv. archt. Noted Aug. 2.

†**Ill., Watseka**—Jan. 8, by Treas. Dpt. at office Sup. Archt., Wash., D. C., constructing U. S. Post Office. Noted Aug. 2.

†**Ill., West Frankfort**—Jan. 8, by Treas. Dpt. at office Sup. Archt., Wash., D. C., constructing U. S. Post Office. Noted Nov. 10, 1932.

†**Ind., Angola**—Dec. 27, by Treas. Dpt. at office Sup. Archt., Wash., D. C., constructing U. S. Post Office. Noted Dec. 21, 1933.

†**Ind., Marinsville**—Jan. 2, by Treas. Dpt. at office Sup. Archt., Wash., D. C., constructing U. S. Post Office. Noted Sept. 6.

†**Ind., Tipton**—Dec. 14, by Treas. Dpt. at office Sup. Archt., Wash., D. C., constructing U. S. Post Office.

†**Ia., Harlan**—Jan. 7, by Treas. Dpt. at office Sup. Archt., Wash., D. C., constructing U. S. Post Office. Noted Sept. 27.

†**Kan., Liberal**—Dec. 28, by Treas. Dpt. at office Sup. Archt., Wash., D. C., constructing U. S. Post Office.

Md., Buena Vista—Dec. 21, by District Comrs., District Bldg., Wash., D. C., constructing additions to sanatorium and nurses home of Children's Tuberculosis Sanatoria, here.

Mass., Barnstable—Dec. 14, by Comrs. Barnstable Co., Court House, brick, stone jail and house of correction, concrete found. $150,000 or more. H. E. Mason, 15 Prospect St., Leominster, archt. Noted Nov. 8.

Mass., Dudley—Dec. 14, by School Building Committee, Town Hall, for Junior High School, 2 story, basement, 60x120 ft., brick, stone, West Main St., $105,000. P.W.A. project. Towner & Sellew Associates, Inc., 329 Main St., Middletown, Conn., archts. Noted Jan. 18.

Mass., Lowell—Dec. 11, by City, W. J. Gargan, inspector of Buildings, City Hall, 2 story, basement, irregular sized, brick elementary school, concrete found., Sycamore St. $125,000 or more. P.W.A. project. H. L. Rourke, 45 Merrimack St., archt.

Mass., Taunton—Dec. 11, by Commonwealth of Massachusetts, Dpt. Mental Diseases, State House, Boston, 3 story, basement, 36x116 ft., 3 story, basement, 38x211 ft. and 4 story, basement, 103x257 ft., brick, stone, granite hospital buildings, nurses home, power lines and tunnels, at State Hospital. Former bids rejected. Kendall, Taylor & Co., 209 Columbus Ave., Boston, archts. R. D. Kimball Co., 6 Beacon St., Boston, engrs. Noted Aug. 30 Daily.

†**Minn., Hibbing**—Dec. 28, by Treas. Dpt. at office Sup. Archt., Wash., D. C., constructing U. S. Post Office; adv. E.N.-R. Dec. 6.

†**Miss., Natchez**—Dec. 28, by Treas. Dpt. at office Sup. Archt., Wash., D. C., extending and remodeling U. S. Post Office. Former bids rejected; adv. E.N.-R. Dec. 6. Noted Sept. 6.

Mont., Billings—Dec. 15 (tentative date), by School Dist. 2, Yellowstone Co., Billings, 3 story, 262x270 ft. school. $250,000. McIver & Cohagen, Hedden Bldg., archts.

Mont., Billings—Feb. 1 (tentative date), by State Bd. Educ., E. Ireland, secy., Helena, 63x230 ft., stone, brick, rein.-con. school, stone found., Eastern Montana Normal School. $250,000. C. Cohagen, Billings, archt. Noted Nov. 15.

Mont., Bozeman—Feb. 1 (tentative date), by Gallatin Co., c/o I. W. Bigelow, clk., 3 story, basement, brick or stone court house, concrete found. $300,000. F. Wilson, Bozeman, archt. Noted Nov. 1.

Mont., Galen (P. O. Warm Springs)—Jan. 15 (tentative date), by State, C. E. K. Vidal, supt. Tuberculosis Sanitarium, for hospital. $215,000. J. G. Link, Billings, archt. Noted Feb. 8.

Mont., Havre—Mar. 1 (tentative date), by State Bd. Educ., E. Ireland, secy., Helena, 3 and 4 story, 40x160 ft. dormitory, Northern Montana College. $165,000. F. F. Bossuot, Harve, archt. Noted Sept. 27.

†**N. J., Garfield**—Dec. 27, by Treas. Dpt. at office Sup. Archt., Wash., D. C., constructing U. S. Post Office; adv. E.N.-R. Dec. 6. Noted Nov. 10, 1932.

†**N. Y., Brooklyn**—Dec. 21, by Treas. Dpt. at office Sup. Archt., constructing Flatbush Postal Station. Noted Nov. 29.

N. Y., New York—Dpt. Health, Centre St., bids about Dec. 15, 3 story, brick health center, 349 East 140th St., $185,000. Noted Sept. 27.

N. Y., South Fallsburgh—Dec. 17, by Bd. Educ., electrical work for auditorium of school building. $6,000. P.W.A. project. Noted Sept. 20.

O., Minford—Minford Rural School Dist., bids about Jan. 1, 2 story, part basement alterations and addition to present high and elementary school buildings, plain founds. $125,700. De Voss & Donaldson, Portsmouth, archts. Noted Oct. 11.

†**Okla., Hugo**—Jan. 3, by Treas. Dpt. at office Sup. Archt., Wash., D. C., constructing U. S. Post Office; adv. E.N.-R. Dec. 6.

†*Federal Government.*

†**Pa., Bala Cynwyd**—Dec. 21, by Treas. Dpt. at office Sup. Archt., Wash., D. C., constructing U. S. Post Office.

†**Pa., Columbia**—Jan. 7, by Treas. Dpt. at office Sup. Archt., Wash., D. C., constructing U. S. Post Office.

†**Pa., Honesdale**—Jan. 8, by Treas. Dpt. at office Sup. Archt., Wash., D. C., constructing U. S. Post Office.

†**Pa., Northeast**—Dec. 27, by Treas. Dpt. at office Sup. Archt., Wash., D. C., constructing U. S. Post Office.

†**Pa., Selinsgrove**—Dec. 27, by Treas. Dpt. at office Sup. Archt., Wash., D. C., constructing U. S. Post Office. Noted Sept. 13.

†**S. C., Greer**—Dec. 27, by Treas. Dpt. at office Sup. Archt., Wash., D. C., constructing U. S. Post Office.

Tenn., Memphis—Dec. 14, by Jones, Furbinger & Jones, archts., Porter Bldg., alterations and additions to 4 story building, Madison Ave. and Dunlap Sts., for University of Tennessee and P.W.A. Knoxville.

Tex., Corpus Christi—Dec. 19, by Corpus Christi Independent School Dist., c/o C. R. Yaeger, pres., 2 story rein.-con. limestone Junior High School, incl. classrooms, 1,250 seating capacity auditorium, cafeteria, manual training room, etc. $300,000. P.W.A. project. Griffith, Hammond & Levy, Inc., Sherman Bldg., archts. H. D. Payne, 4301 Main St., Houston, assoc. archt. L. D. Toyer, Smith Young Tower, San Antonio, mechanical engr. Lilly & Drought, Frost Natl. Bank Bldg., San Antonio, structural engr. Noted June 7.

Tex., Freeport—See "Earthwork, Irrigation, Drainage and Waterways."

†**Va., Orange**—Dec. 28, by Treas. Dpt. at office Sup. Archt., Wash., D. C., constructing U. S. Post Office.

†**Va., Richmond**—Dec. 14, by Treas. Dpt. at office Sup. Archt., Wash., D. C., installing complete elevator plant in U. S. Parcel Post Building.

Wash., Pullman—Dec. 28, by State Bd. Regents, mechanical equipment, incl. boilers and piping for power plant for State College; adv. E.N.-R. Dec. 6. Noted Sept. 20.

†**Wis., Ladysmith**—Jan. 8, by Treas. Dpt. at office Sup. Archt., Wash., D. C., constructing U. S. Post Office. Noted Sept. 6.

Ont., Kingston—Dec. 21, by Director of Contracts, Dpt. National Defense, Ottawa, plans brick, rein.-con. mess and recreation building, plain found., at Royal Military College. $350,000.

CONTRACTS AWARDED

Calif., Long Beach—Bd. Educ., general contract commercial and science buildings, at Polytechnic High School, to Myers Bros., 3407 San Fernando Rd., Los Angeles, $213,058, using salvaged materials, incl. cabinets. **P.W.A.** Awarded Nov. 19. Noted Feb. 1 E.N.-R. and Nov. 23 Daily.

Calif., Los Angeles—Bd. Educ., reconstructing, rehabilitating, strengthening Building 1 and arcade at 2nd St. School, to Atlas Constr. Co., 39 Congress St., Pasadena, $49,400. W. Mellema, 1661½ Beverly Blvd., archt.; reconstructing, rehabilitating and strengthening main building at Leland St. School, San Pedro, to Durr & Vandenhoogen Co., 733 West 14th St., Long Beach, $73,250, Barker & Ott, 3461½ South La Brea Ave., archts., and L. J. Waller, 4350 Beverly Blvd., engr. **P.W.A.** Awarded Nov. 19.

†**Calif., San Francisco**—Twelfth Naval Dist., 100 Harrison St., repairing existing refrigeration plant, having equipment located in several buildings, consolidation and reinstalling same in 1 basement room of Building 11, Receiving Ship Station, Yerba Buena Island, San Francisco Bay, to General Eng. & Drydock Co., 1100 Sansome St., $1,985. Bids Nov. 21, awarded Nov. 26.

Conn., Hamden—Town, R. F. Collins, chn. School Comn., Hamden, Memorial Town Hall, electrical work for high school Dixwell Ave., to Wiehn Electric Co., 57 Easton Ave., Waterbury•••heating, to Mayflower Sales Co., Inc., 14 Haynes St., Hartford•••structural steel, to Bethlehem Fabricators, Inc., Bethlehem, Pa.••• reinforcing steel, to Topper & Griggs, 200 North Main St., West Hartford•••cast stone, to Dexatone Co., 1335 Dixwell Ave., New Haven. Noted Sept. 27, under "Contracts Awarded."

†**Conn., New Haven**—Treas. Dpt. at office Sup. Archt., Wash., D. C., replacing fractured architrave, point masonry, repairing granite and marble for U. S. Post Office, to Washbourne Reconditioning Co., Bayside, N. Y. $8,440.

Mass., Lawrence—City, Dpt. P. Buildings, Dr. J. J. Deacy, chn. Bd. Health, City Hall, general contract 3 story, basement, 40x72 ft. and two wings, one 27x68 ft. and other 27x60 ft., brick, cast stone hospital, concrete found., Marston St., to A. F. Smiley Constr. Co., 202 Oak Hall Bldg., Pawtucket, R. I., $114,760. **P.W.A.** Bids Nov. 5, awarded Nov. 22. Noted Nov. 1.

Mass., Wellesley — Town, P. Taylor, chn. North Dist., Town Hall, excavating for 2 story, basement, irregular sized school, Walnut and Washington Sts., to Otto A. Theurer Constr. Co., Inc., 171 Watertown St., Watertown••• light iron, to Babcock Davis Corp., 474 Dorchester Ave., South Boston•••structural steel, to Groisser Shlager Iron Wks., 84 Washington St., Somerville•••cast stone, to Durastone Co., Saylesville, R. I.•••electrical work, to Miles P. Robinson, 24 Church St., Wellesley••• plumbing, to T. J. Murphy & Co., 8 Walden St., Cambridge•••heating and ventilating, to V. J. Kenneally Co., 251 Causeway St., Boston •••mill work, to Hyde Murphy Co., 80 Boylston St., Boston. Noted Nov. 15, under "Contracts Awarded."

†**Mich., St. Johns**—Treas. Dpt. at office Sup. Archt., Wash., W. C., constructing U. S. Post Office, to H. Dattner, 1515 Barlum Tower, Detroit, $30,615. Bids Nov. 6. Noted Oct. 25.

†**Miss., Meridian**—Dpt. Agriculture, Wash., D. C., constructing new basement, attic cold storage first floor fruit and vegetable products building, size 44x67 ft., at U. S. Pecan Field Station, near here, to B. L. Knost, Pass Christian, $31,642. Bids Nov. 2. Noted Oct. 4.

Miss., Whitfield—State Hospital Removal & Land Sale Comn., furnishing, installing power generators, etc. for new State Hospital for Insane, 1 uniflow steam engine, 200 kw. generator, incl. switchboard for 2 units, to Elliott Co., Frick Bldg., Pittsburgh, Pa., $20,961•••• 1 straight gas engine 200 kw. generator with cooling tower, to Cooper-Bessemer Corp., Mount Vernon, O., $17,400. Noted Oct. 31 Daily, under "Jackson."

N. H., Concord—State, H. Cheney, purch. agt., State House, furnishing pumping equipment for New Hampshire State Hospital, to Warren Steam Pump Co., 101 Milk St., Boston, Mass., $4,651. Awarded Nov. 26. J. H. Stevens, 46 Manchester St., Manchester, engr.

†**N. J., Freehold**—Treas. Dpt. at office Sup. Archt., Wash., D. C., constructing U. S. Post Office, to Bradley Contg. & Constr. Co., 802 Fox Bldg., Phila., Pa., $47,234. Bids Nov. 15. Noted Nov. 1.

N. J., Penns Grove—School Dist. Penns Grove and Upper Penns Neck, Penns Grove, general contract high school, to A. W. Funk & Co., Commercial Trust Bldg., Phila., Pa., $179,914 •••heating and ventilating, also plumbing, to Harry Knecht Co., 415 Ritchie Ave., West Collingswood, $37,078 and $14,690 respectively •••structural steel and ornamental iron, to Structural Steel Erecting Co., 7011 Grays Ave., Phila., Pa., $22,426•••electrical work, to W. E. Snell, 266 Elmer St., Vineland, $15,765. Grand total $269,973. **P.W.A.** Noted Oct. 18.

N. Y., Mount Upton—Central School Bd., heating and ventilating in school, to F. G. Cook & Sons, Inc., Kenmore, $11,397. **P.W.A.** Noted Aug. 9, under "Contracts Awarded."

†**N. Y., New York**—James Stewart, Inc., general constractors, 230 Park Ave., about 16,000 tons structural steel for U. S. Post Office, Vesey, Barclay and Church Sts., to McClintic-Marshall Co., Pittsburgh, Pa., for Treas. Dpt. at office Sup. Archt., Wash., D. C. Noted Nov. 22, under "Contracts Awarded."

N. Y., Westbury—Bd. Educ., heating for school, to Hermann's Mechanical Contg. Co., Inc., 103 Park Ave., New York, $34,764. **P.W.A.** Noted Oct. 4, under "Contracts Awarded."

N. M., Albuquerque — University of New Mexico, general contract brick, concrete administration and laboratory building on campus, to T. Bate, 2311 10th St., Denver, Colo., $173,497. **P.W.A.** Bids Nov. 22. Noted Sept. 27.

N. C., Greensboro—University of North Carolina, Womens College, alumnae house for womens college, to C. W. Angle, Inc., Greensboro, $99,474•••heating and ventilating and plumbing, to Crutchfield-Sullivan Co., Greensboro, $5,545 and $4,925 respectively. Grand total $109,944. **P.W.A.** Noted Nov. 15 Daily.

R. I., Burrillville (mail Harrisville)—State, Dr. H. L. Barnes, supt. Wallum Lake Sanatorium, for general contract 2 story, basement, 40x210 ft., nurses' home and employees unit at Wallum Lake Sanatorium, to O. D. Purington Co., Inc., 49 Westminster St., Providence, $98,548 •••electrical work, to Liberty Electric Co., Barrington, $6,836•••heating and plumbing, to J. F. Martin Co., Inc., 236 East Ave., Pawtucket, $7,896 and $8,540 respectively. Grand total $121,820. Bids Nov. 3. Noted Nov. 1.

S. C., Greenville—Greenville City Hospital, hospital building, to Morris-McKoy Building Co., Greenville, Est. $140,000. **P.W.A.** J. E. Sirrine & Co., Greenville, engrs.

Tex, Austin—City, c/o J. E. Morgan, mgr., Austin, four 1 story 50x110 ft., rein.-con., brick public market buildings, general contract, to W. J. Schwarzer, 406 West 35th St., $48,284 •••electric wiring, to J. L. Martin, 410 Cong. Ave., $1,017•••plumbing, to Spiller-Miller Co., 202 South 1st St., $2,511. Grand total $51,812. **P.W.A.** Bids Oct. 17. Noted Oct. 11 Daily.

Tex., Austin — University of Texas, Bd. Regents, c/o J. W. Calhoun, comptroller, general contract administration building incl. 2 wings each 4 stories, stone hollow tile, etc., and 16 story, 60x60 ft. Indiana limestone, brick, steel tower, incl. heating, lighting, ventilating and electrical work, to W. S. Bellows Constr. Co., Oklahoma Savings Bank Bldg., Oklahoma City, Okla., $1,589,605. **P.W.A.** Bids Nov. 28. Noted Nov. 1.

Tex., Fort Worth—Bd. Educ., c/o E. P. Williams, bus. mgr., 409 East Weatherford St., general contract 10 additional classrooms, library, cafeteria, auditorium and medical units at Alice E. Carlson School, to H. B. Friedman, 1407 Sinclair Bldg., $108,700•••electric wiring, to Shotts Electric Co., 904 Throckmorton St., $5,104•••plumbing, heating and ventilating, to

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Public Buildings (Continued)

Young & Pratt, Barton Springs Rd., Austin, $17,788. Grand total $131,592. **P.W.A.** Bids Oct. 9. Noted Sept. 27.

†Tex., McAllen—Treas. Dpt. at office Sup. Archt., Wash., D. C., 1 story, mezzanine, 56x119 ft., brick, steel post office, to Murch Bros., 4111 Lindell Blvd., St. Louis, Mo., $45,100. Bids Nov. 16. Noted Oct. 25.

Ont., Ottawa—Secretary Dpt. P. Wks., Ottawa, 9 story, 2 sub-basements, 152x187 ft., brick, steel stone office building, plain found., for Royal Canadian Mounted Police, Wellington St., to Ulric Boileau Ltd., 4869 Garnier St., Montreal, Que., $1,198,000 if Canadian steel is used, $1,173,000 if U. S. A. steel is used; ventilation system $6,670. Bids Nov. 30, awarded Nov. 30. Noted Nov. 1.

Que., Montreal—Secretary Dpt. P. Wks., Ottawa, Ont., custom house addition, McGill St., to A. Janin & Co., Ltd., 1460 Sherbrooke St. W., $1,289,000. Noted Nov. 1.

COMMERCIAL BUILDINGS

PROPOSED WORK

Mich., Detroit — B. F. Keith Estate, Temple Theatre Bldg., Monroe Ave., plans by Smith, Hinchman & Grylls, Marquette Bldg., multi story, 124x125 ft., brick, steel, rein.-con., stone office building, Monroe Ave.

N. Y., Brooklyn—Empire Impvt. Co., 5201 14th Ave., plans by Cohn Bros., 191 Joralemon St., 6 story, 90x100 ft., apartment, Avenue I and 31st St. $220,000.

N. Y., Brooklyn—Highway Gardens, Inc., 26 Court St., plans by M. N. Weinstein, 93 Court St., 6 story, brick apartment, 23rd St. and Kings Highway. $300,000.

N. Y., Brooklyn—Robertson-Goetz Co., 311 Marine Ave., plans by I. Gabalchnick, 1838 West 5th St., 6 story, 40x80 ft., brick apartment, 3rd and Marine Aves. $150,000.

N. Y., New York—Artro Realty Inc., L. H. Blumenthal, 755 7th Ave., plans by T. W. Lamb, 701 7th Ave., mechanical equipment and air conditioning, Casino Theatre, 154 West 50th St. $30,000.

N. Y., New York—Big Seal Realty Corp., 235 East Mount Eden Ave., plans by Sampson & Levy, 341 East 149th St., altering heating, plumbing in 4 story apartment, Tinton and Westchester Aves. $28,000.

N. Y., New York—Gerry Estates, 270 Bway., plans 3 story, store and office, 7th Ave. and 42nd St. To exceed $150,000. Architect not appointed. Rialto Times Square, Inc., c/o A. Campagna, 175 Riverside Dr., lessee.

N. Y., New York—Granford Realty Co., 1070 Anderson Ave., plans by H. Ginsbern, 205 East 42nd St., 6 story, 86x100 ft., brick apartment, Grand Ave. and Fordham Rd. $150,000.

O., Cincinnati—Metropolitan Heating Corp., c/o H. Rowe, chn., plans multiple housing project, $6,000,000; parks and playgrounds, $1,000,000 on westside. F. W. Farber, et al., 616 Walnut St., archts. Fosdick & Hilmer, et al., Union Trust Bldg., engrs.

Vt., Middlebury — Middlebury College preliminary sketches by Dwight Jas. Baum, Waldo Ave. and 244th St., New York, women's group, incl. dormitory, class buildings and gymnasium, $1,000,000.

CONTRACTS AWARDED

Calif., El Cerrito—I. W. Coburn, general contractor, 2048 Market St., San Francisco, electrical work for 2 story, rein.-con. orphanage, to Scott-Butner Co., 23rd and Webster Sts., Oakland, for Chung Mei Home, 3000 9th St., Berkeley. Noted Oct. 18, under "Contracts Awarded."

Ind., Indianapolis—W. H. Block & Co., Market and Illinois Sts., escalators for department store, to Otis Elevator Co., 11th Ave. and 26th St., New York, and Indianapolis, about $45,000. Noted Mar. 15, under "Contracts Awarded."

N. Y., New York—Metropolitan Life Insurance Co., 1 Madison Ave., general contract altering ventilating and heating system in 6 story apartment, 1 West 30th St., to Bing & Bing, 119 West 40th St. Est. $35,000. Noted Nov. 22.

Tex., Dallas—Gulf States Life Insurance Co., Main and Ackard Sts., 6 story, brick, steel top addition to office building, Main and Ackard Sts., to P. O'B. Montgomery, 3137 Knox St., Dallas. Est. $175,000. Lang & Winchell, 1st Natl. Bank Bldg., archts.

Ont., Toronto—Womens College Hospital, 125 Rusholme Rd., plumbing and heating for 10 story, basement, hospital, to W. J. McGuire Ltd., 91 Jarvis St; electric wiring, to Canada Electric Co. Ltd., 175 King St. E. Noted Aug. 2, under "Contracts Awarded."

INDUSTRIAL BUILDINGS

PROPOSED WORK

Ala., Birmingham — BOTTLING PLANT — Pepsi Cola Co., 40th Ave. and 9th St., Long Island City, New York, plans leasing or acquiring bottling plant and altering and reconditioning same. Est. $28,000 or more.

Ark., Texarkana — MILL — C. C. Reynolds, Texarkana, plans saw and lumber mill, near here. To exceed $30,000. Architect not appointed.

Calif., Pajaro — PLANT — Matiasevich Co. plans de-hydrating plant, to replace plant destroyed by fire. To exceed $28,000 with equipment. $60,000 fire loss.

Ill., Elgin—PLANT—Illinois Watch Case Co., Dundee Ave., plans plant addition. $150,000. **Maturity indefinite.** Architect not appointed.

Ill., Havana — PLANT — Crescent Forge & Shovel Co., plans repairing and altering plant. To exceed $30,000.

Ky., Louisville—BOTTLING PLANT—Pepsi Cola Co., 40th Ave. and 9th St., Long Island City, New York, plans leasing or acquiring plant and reconditioning same for bottling plant, 100 cases per hr. or more capacity. To exceed $28,000.

Mass., Haverhill—STORAGE—Essex Brewing Co., Railroad Ave., plans by C. F. Hettinger, 20 Ainsworth St., Roslindale, 2 story, 40x60 ft., brick, steel, concrete brewery storage unit, Railroad St.

Mass., Lynn—GARAGE, etc.—Owner, c/o G. A. Cornet, archt., 14 Central Ave., made plans brick, concrete garage and laboratory. Est. $28,500. Project indefinitely in abeyance.

Mich., Port Huron — BREWERY — Lakeside Brewing Co., c/o G. A. Mueller, archt., 1346 Bway., Detroit, sketches brick, steel, rein.-con. brewery, plain found. Est. about $150,000.

Mich., Iron Mountain—STORAGE, etc.—Gannon Wholesale Grocery, plans storage and distribution. $30,000 or more. **Maturity indefinite.** Architect not appointed.

Mich., Wyandotte—BREWERY, etc.—Marx Brewing Co., Wyandotte, plans altering brewery and bottling plant. $40,000.

Mo., St. Louis—PLANT—Carter Carburetor Corp., 2838 North Spring Ave., plans future plant additions on newly purchased 60x250 ft. site, 2843 North Grand Blvd.

N. J., Jersey City—INDUSTRIAL—Jersey City Printing Co., 160 Maple St., plans constructing industrial plant at Morris Canal. To exceed $28,000. **Maturity indefinite.** Site acquired.

N. Y. Brooklyn—GARAGE, SHOWROOM, etc. —B. Falchi, 1915 58th St., plans by C. Van Keuren, 335 East 19th St., 2 story garage, showroom, store and apartment, McDonald Ave. and Avenue X. $40,000.

N. Y., Lewiston—STORAGE—Canadian Wineries Ltd., Stamford, Ont., Canada., plans nearing completion and takes bids early in 1935 expanding storage facilities from 100,000 gal. to 1,000,000 gal. $100,000-$150,000. G. Macy, c/o owner, engr. Noted Oct. 8.

N. Y., Long Island City—FACTORY—Ford Instrument Co., 22-36 47th St., plans by E. Ross, c/o owner, 1 story, 200x300 ft. factory addition, 47th Ave. and 33rd St. $50,000.

factory, 630 West 52nd St. To exceed $28,000.

N. Y., New York—PLANT—Atwood Multiple Writer Co., c/o Miller & Murry & Co., 444 Madison Ave., plans plant for manufacturing typewriter parts and assembly. To exceed $28,000 with equipment.

N. Y., New York — FACTORY — Estate of Alexander List, 155 East 44th St., plans by M. J. McQuillan, c/o owner, altering 4 story

N. C., Fairmont—STORAGE—Lovell Joyce & Co., Fairmont, plans replacing tobacco storage, recently burned. $60,000 loss. To exceed $28,000. Architect not appointed.

O., Leetonia—FACTORY—Leetonia Tool Co. plans new brick, steel, concrete addition, adjacent to present factory. $40,000. Private plans.

O., Salineville — TUNNEL KILN — National China Co. plans new circular kiln at National China Co. plant which has been acquired by Pittsburgh and West Virginia capitalists, and will be reopened shortly after Dec. 1. $50,000. Private plans.

O., Sidney—BREWERY—John Wagner Sons Brewing Co., plans reconditioning brewery. $75,000.

Pa., Bradford—CRUDE RECOVERY PLANTS —Forest Oil Corp. plans installing air and water pressure plants to force recovery of crude oil from wells at various locations in Crawford, Venango and Warren Counties. To exceed $17,750.

Pa., Corry — PLANT — Dallas E. Dindslow, Inc., c/o M. R. Olds, Corry, purchased plant and business of Climax Mfg. Co., and plans rehabilitating plant and installing some new equipment, for manufacture of logging locomotives and parts. To exceed $28,500.

Pa., Verona—PLANT—American Steel Fdry. Co., Park Bldg., Pittsburgh, and Verona, does not plan altering plant and purchasing equipment. $500,000-$1,000,000. (**Correction**—Information was incorrect.) Noted Nov. 15.

R. I., Fiskville—MILL—Arkwright Finishing Co., 1105 Turks Head Bldg., Providence, soon lets contract 1 story, basement, 65x188 ft., brick, steel addition, concrete found. To exceed $28,500. C. R. Makepeace & Co., 904 Grosvenor Bldg., Providence, archts.

Tenn., Memphis—BOTTLING PLANT—Pepsi Cola Co., 40th Ave., and 9th St., Long Island City, N. Y., plans leasing or acquiring plant and reconditioning same for bottling plant. To exceed $28,000.

Tex., Tyler—SKIMMING PLANT, etc.—International Petroleum Co., c/o S. Dayson, Baird, plans 2,500 bbl. skimming plant and cracking unit, Reed Switch, East Texas.

Va., Glasgow—FACTORY—Blueridge Co., Inc., soon lets contract constructing carpet and rug factory. $150,000. Ballinger Co., 105 South 12th St., Phila., Pa., engrs. and archts.

Wash., Rochester—SAW MILL—W. D. Jones, Oakville, plans saw mill, 15,000 ft. daily capacity. To exceed $28,500.

Wis., Park Falls—LUMBER MILL—Nelson & Cecil Co., Park Falls, plans lumber mill. Est. about $28,000.

Ont., Drummondsville—PLANT—Eagle Pencil Co., 703 East 13th St., New York, does not plan 2 story, brick, steel, concrete plant addition at this time. $40,000. (**Correction**—Information was incorrect.) Noted Oct. 25.

BIDS ASKED

Calif., San Francisco — FACTORY — Dreamland Bedding Co., 534 Bayshore Blvd., taking bids 1 story, mezzanine floor, 25x109 ft., concrete factory, Bayshore Blvd.

Colo., Durango—GOLD MINING DEVELOPMENT—See "Contracts Awarded."

N. M., Carrizozo—MINING DEVELOPMENT —See "Contracts Awarded."

Tenn., Cleveland — PUBLISHING HOUSE — Church of God, S. W. Latimer, genl. overseer, Cleveland, taking bids 4 story, basement publishing house, Montgomery St. To exceed $100,000. E. L. Simmons, Bell Ave., Chattanooga, archt.

CONTRACTS AWARDED

Calif., Clarksburg — SUGAR REFINERY — Amalgamated Sugar Co., Ogden, Utah, foundation work for sugar refinery, to Lord & Bishop, Box 355, Oroville. Total est. $1,000,000. Awarded Nov. 20. Noted Oct. 25.

Calif., Los Angeles—ICE CREAM FACTORY —Betty Bolton Ice Cream Co., 1766 North Highland Ave., concrete, brick, stucco, 927 North Sycamore Ave., to E. A. Kaiser Co., 155 North La Brea Ave. Est. exceeds $28,500. G. Fosdyke, 112 North Main St., engr.

Colo., Durango—GOLD MINING DEVELOPMENT—Pioneer Gold Producers, Inc., M. B. Bates, pres., Durango, gold mining development in vicinity of here, day labor. Est. about $150,000, incl. equipment.

Conn., Torrington—PLANT—Torrington Electric Light Co., 69 Water St., Torrington, 2 story, 50x100 ft., brick, steel, electric power plant addition, Water St., to Torrington Building Co., 182 Church St., $35,000. Private plans.

†Ill., Oak Park—Treas. Dpt. at office Sup. Archt., Wash., D. C., constructing U. S. Post Office, to Holton, Seelye & Co., 32 West Randolph St., Chicago, $146,179. Bids Nov. 15. Noted Nov. 1.

Ky., Louisville — DISTILLERY — Joseph & Joseph, archts., Breslin Bldg., copper work for complete distillery units, Dixie Hy., to Matt Corcoran & Sons, 118 North 5th St.•••iron work and equipment, to Logan Co., Franklin and Buchanan Sts.•••tubs and tanks, to W. E. Caldwell Co., 200 East Brandeis St.•••engines, to Tyne Co., c/o architects•••1 well pump, to Andriot Davidson Co., Starks Bldg.•••plumbing, to Crescent Plumbing & Heating Co., 821 East Jefferson St.•••2 well pumps and boilers, to Vogt Mchy. Co., 1402 West Main St., for Stitzell Weller Distillery Co., 1033 Story Ave. Noted Nov. 22, under "Contracts Awarded."

Ky., Louisville — Kentucky Macaroni Co., Floyd St. and Southern R.R., constructing 80x160 ft., brick, steel addition, incl. new heating and sprinkler systems, general contract, to J. D. Jennings, 328 East Breckenridge St., about $22,000. D. X. Murphey & Bro., Louisville Trust Bldg., archts.

Me., Auburn—BOTTLING PLANT—Seltzer-Rydholm Co., Inc., 244 Minot Ave., general contract 2 story, basement, 50x100 ft., brick, structural steel, to J. A. Greenleaf & Sons Co., 20 Washington St., to exceed $28,500, work well under way•••heating and plumbing, to A. J. Thayer, Auburn•••electrical work, to C. E. Kerr Electric Co., Inc., 44 Fern St.

N. M., Carrizozo—MINING DEVELOPMENT —Deal Del Monte Metals Co., C. E. Degner, pres., developing mining properties near here, by day labor. To exceed $100,000. Noted Nov. 22.

N. Y., Endicott—FACTORY—Endicott Johnson Co., Endicott, 1 story, basement, 66x160 ft., steel, brick, plain found., Susquehanna St., own forces. To exceed $28,500. Steel, to Williams Bridge Co., Union Bldg., Syracuse. Private plans.

N. Y., New York—FACTORY—E. H. Fickenger, 11 Gateway Dr., Great Neck, altering factory, incl. new boiler room, boiler, etc., 516 West 25th St., to Wheeler Eng. Co., 369 Lexington Ave. Est. $28,000. Noted Nov. 22.

N. Y., Rensselaer—BULK OIL STATION—Atlantic Refining Co., 260 South Broad St., Phila., Pa., constructing (1st unit) 1 story, 50x75 ft. garage and office building, to Holcombe Anthony, 523 Clinton Ave., Albany. Total est. $200,000.

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†Federal Government.